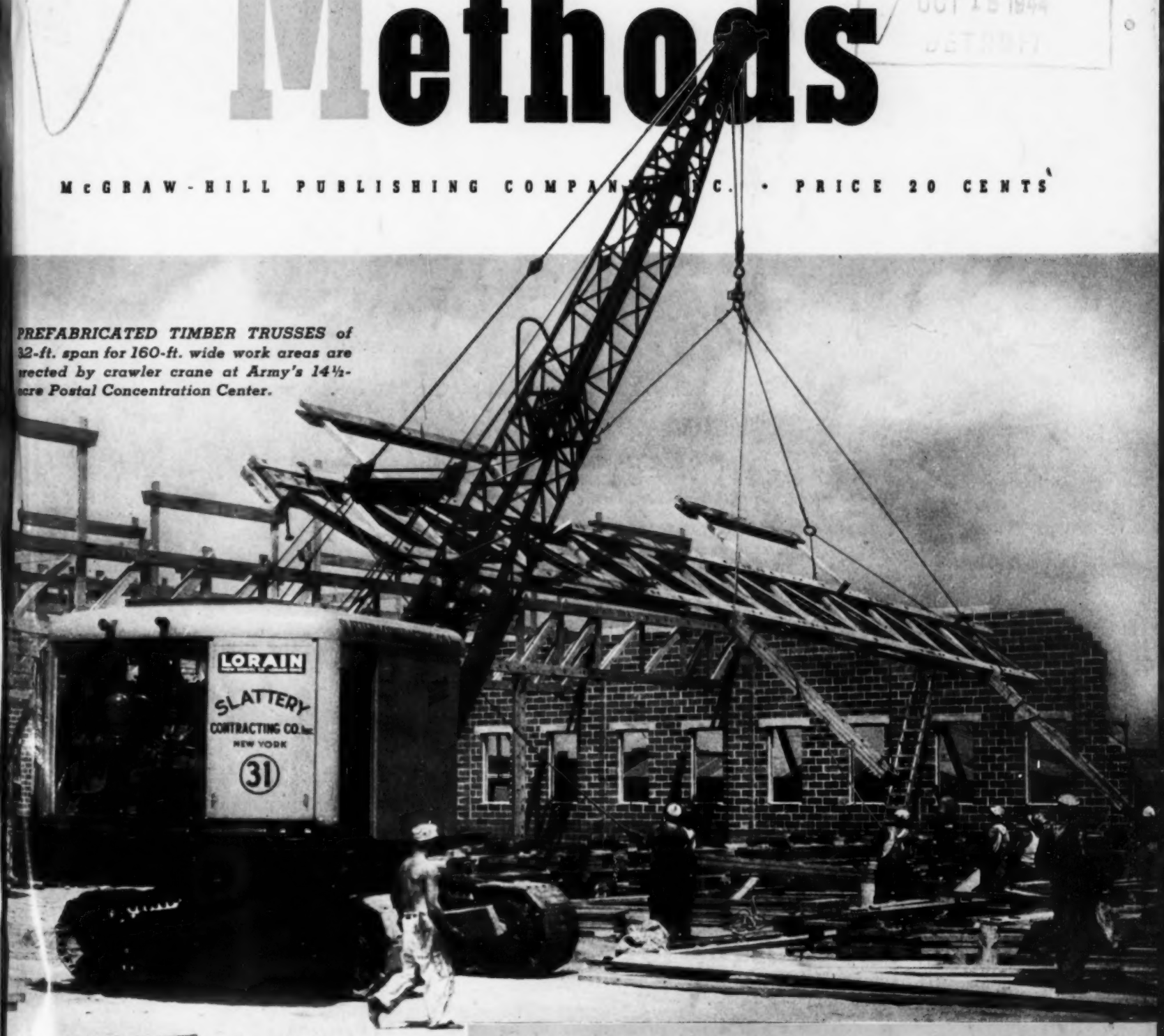
A PICTORIAL SURVEY OF CURRENT PRACTICE, EQUIPMENT AND MATERIALS

Construction Methods

PUBLIC LIBRARY
OCT 18 1944
DETROIT

McGRAW-HILL PUBLISHING COMPANY, INC. • PRICE 20 CENTS



PREFABRICATED TIMBER TRUSSES of 32-ft. span for 160-ft. wide work areas are erected by crawler crane at Army's 14½-acre Postal Concentration Center.

OCTOBER, 1944

In this Issue: **Erecting 14½-acre Army Post-Office Building on 72-Day Schedule . . . Huge structure required 943 timber roof trusses and 390,000 precast concrete blocks for walls.**

★ ★ ★

Reconversion Project Prepares Ammunition Factory for Battery

Feel the Grip of the HI-BOND Bar!

Take a firm hold on a piece of Inland HI-BOND Reinforcing Bar and note its grip. This is important to you because when HI-BOND bars are placed in concrete they assure a more effective mechanical grip irrespective of the position in which they are cast or the direction in which they are pulled.

The Inland HI-BOND Bar gives the first real improvement in the bonding value of reinforcing bars in more than 30 years. The scientific design of this new Inland HI-BOND concrete reinforcing bar, with its reversed double helical ribs, provides vastly greater anchorage and bonding strength. It provides more efficient transfer of stress at splices. The use of HI-BOND Bars will materially reduce the width of cracks thereby reducing the possibility of corrosion and preserving the appearance and safety of reinforced concrete members.

Inland HI-BOND Bars are made in nine standard areas in both new billet and rail steel qualities.

Write for the new bulletin on Inland HI-BOND Reinforcing Bars.

INLAND STEEL COMPANY

38 S. Dearborn St., Chicago 3, Illinois

Sales Offices: Cincinnati • Detroit • Kansas City • Milwaukee • New York • St. Louis • St. Paul

CURRENT JOBS
. . . and Who's Doing Them

BUILDINGS

Public—Ordnance plant will be built at Amarillo, Tex., by **A. J. McKenzie Construction Co.**, of San Antonio, for $5,750,000. Navy contract for storehouses at Clearfield, Utah, was awarded to **Utah Construction Co.** and **J. H. Pomeroy & Co.**, of Salt Lake City, for $3,038,701. **Fegles Construction Co.**, of Minneapolis, Minn., has $3,000,000 Army contract for ordnance plant at St. Paul. Contract for $3,000,000 ordnance plant at West Point, Miss., was awarded to **Foster & Creighton Co.** and **Oman Construction Co.**, of Nashville, Tenn. **Austin Co.**, of New York, N. Y., will build manufacturing plant at Hicksville for $2,500,000. Army contract for $1,500,000 arsenal at Denver, Colo., was awarded to **Kershaw, Swinerton & Walberg** of Denver. Another $1,500,000 Army contract for administration building at Chicago, Ill., went to **Coath & Goss**, of Chicago. **John A. Johnson Contracting Corp.**, of Brooklyn, N. Y., has $1,468,857 Navy contract for storehouses at Scotia. Contract for ordnance plant at McGregor, Tex., was awarded to **Jas. T. Taylor & Son**, of Fort Worth, for $1,467,679. **Kuhne-Simon Assoc.**, of Rantoul, Ill., will build 399 temporary dwellings at Royal Oak, Mich., for $1,370,000. **Foster-Creighton Co.** and **Oman Construction Co.**, of Nashville, Tenn., have $1,300,000 Army contract for ordnance plant at Aberdeen, Miss. Navy contract for buildings at Tacoma, Wash., went to **Henrick Valle Co.**, of Seattle, for $1,996,000. **Welso Construction Co.** of Chicago, Ill., has $1,294,845 contract for housing in Chicago. Hospital and laundry at Perry Point, Md., will be built by **Wm. R. Goss Co.**, of Chicago, Ill., for $1,039,000. **F. H. McGraw Co.**, of Hartford, Conn., has $1,000,000 contract for chemical plant at Front Royal, Va.

Industrial—Chemical plant at Pasadena, Tex., will be built by **United Engineers & Constructors**, of Houston, for $3,750,000. Contract for $1,500,000 steam plant at Savannah, Ga., was awarded to **Rust Engineering Co.**, of Birmingham, Ala. **E. D. Badger & Sons**, of Boston, Mass., will build chemical plant at Richmond, Calif., for $1,000,000.

HEAVY CONSTRUCTION

Contract for Naval storage area at Port Chicago, Calif., was awarded to **Barrett & Hilp**, of San Francisco, for $5,296,848. Dock at North Vancouver, B. C., will be built by **B. C. Bridge & Dredging Co., Ltd.**, of Vancouver, for $1,500,000. Low bidder on $1,655,255 airport improvements at Parkersburg, W. Va., is **R. Meyers**, of Salem, Ind., and **Western Contracting Co.**, of Sioux City, Ia. **United Concrete Pipe Corp.**, of Los Angeles, Calif., has $1,546,000 contract for ammunition yard at Seal Beach. Army contract for Mather Field, Calif., was awarded to **A. Teichert & Son, Inc.**, of Sacramento, for $1,348,888. Low bid of $1,303,468 on classification yard at Port Chicago, Calif., was submitted by **MacDonald & Kahn, Inc.**, of San Francisco. Contract for airport clearing at Springfield, O., went to **Lewis & Frisinger, Julius Porath** and **Schwaderer & Co.**, of Ann Arbor, Mich., for $1,213,811. Air station buildings at Alameda, Calif., will be built by **Dinwiddie Construction Co.**, of San Francisco, for $1,157,800. Navy contract for runways at Glynco, Ga., went to **H. E. Wolfe Construction Co.**, of St. Augustine, for $1,080,572. **J. A. Casson Co.** and **N. M. Ball Sons**, of Hayward, Calif., will build airport runways at Fairfield for $948,943.

HIGHWAYS

Among recent highway contract awards are the following: Alabama: $554,304 to **E. J. & W. L. Cobb Co.**, of Montgomery; and $408,397 to **Cobb Bros. Construction Co.**, of Meridian, Miss. California: $784,629 to **A. Soda & Son**, of Oakland; and $885,000 from **Basich Bros.**, of Alhambra. Illinois: $566,461 and $425,367 to **White Consolidated, Inc.**, of Chicago; and $237,334 to **Collignon Construction Co.**, of Davenport, Ia. Indiana: $250,812 and $257,595 to **Wayne Paving Co.**, of Fort Wayne. Kentucky: $251,546 to **Landrey & Teegarden**, of Columbus, Ind. New Jersey: $213,584 to **Standard Bitulithic Co.**, of New York, N. Y. Virginia: $217,009 to **G. P. Clay**, of Richmond.

Copyright, 1944 — Established 1919

McGraw-Hill Publishing Co., Inc., 330 West 42nd St., New York (18)

Construction Methods

A Pictorial Survey of Current Practice, Equipment and Materials

JOHN ABBINK, Publisher

ROBERT K. TOMLIN, Editor — A. E. PAXTON, Manager

Editorial Staff: Vincent B. Smith, Paul Wooton (Washington) N. A. Bowers (San Francisco) Nelle Fitzgerald Patricia McGerr

OCTOBER, 1944

PUBLIC LIBRARY
OCT 18 1944
DETROIT

THE *How* OF IT

For the benefit of readers concerned with the practical application of method or equipment the following references are to articles or illustrations in this issue that tell:

How **TANK-DOZER** spearheaded Allied advance across France by breaking through anti-tank obstacles —p. 51

How **14½-ACRE ARMY POST OFFICE** was constructed in 72 days, with 943 timber trusses for roof and 390,000 concrete blocks for walls—p. 54

How **FIRE WALL** was constructed with 12-in.-wide cinder-concrete block —p. 58

How **TIMBER TRUSSES** were prefabricated at site of project —p. 59

How **FRENCH FARM ROLLER** was used by RAF to level landing strip —p. 63

How **PERU HYDRO PLANT**, started with hand labor, will use American equipment for rock tunneling and dam construction —p. 64

How **TWO-LINE CABLEWAY**, anchored in solid granite canyon wall, carried workmen and supplies across canyon —p. 65

How **AMMUNITION FACTORY** was reconverted for battery production —p. 66

How **ROLLING SCAFFOLDS** facilitated installation of new lighting fixtures —p. 67

How **HEAVY-DUTY CONSTRUCTION EQUIPMENT** aids Army Engineer operations in France, England, Italy and South Pacific —p. 70

How **STEEL ROADWAY SECTIONS** were used to bridge French river with aid of crane —p. 72

How **NEW-TYPE VIBRATOR** speeded concrete laying operations on landing strip —p. 74

How **JACK TESTS** static load or overload on anchor windlass in ship production —p. 74

How **ALL-WELDED STEEL TANKERS** were built and side-launched —p. 76

How **BULKHEADS**, main deck and deck-houses were installed on ship's hull —p. 77

How **FORWARD COFFERDAM**, weighing 94 tons, was erected complete with machinery and piping —p. 78

How **LARGER DIAMETER TEST CELLS** were concreted to ¼-in. tolerance —p. 79

How **HOISTING POLES** raised arches of packaged steel hangar at Washington National Airport —p. 82

McGRAW-HILL PUBLISHING COMPANY, INC., 330 WEST 42d STREET, NEW YORK (18), N. Y.

JAMES H. McGRAW, Founder and Honorary Chairman

Editorial and Publishing Offices: 330 West 42nd St., New York (18); 520 North Michigan Ave., Chicago (11); 68 Post St., San Francisco (4); 738-9 Oliver Bldg., Pittsburgh; Aldwych House, London, W. C. 2, England. Branch Offices: Washington; Philadelphia; Cleveland; Detroit; St. Louis; Boston; Los Angeles; Atlanta, Ga.

JAMES H. McGRAW, JR., President — **HOWARD EHRLICH**, Executive Vice-President for Business Operations — **JOHN ABBINK**, Executive Vice-President for Editorial Operations

CURTIS W. McGRAW, Vice-President and Treasurer — **JOSEPH A. GERARDI**, Secretary — **J. E. BLACKBURN**, Circulation Manager

CONSTRUCTION METHODS, October, 1944. Volume 26, Number 10. Published Monthly, price 20¢ a copy. **Return Postage Guaranteed.** Allow at least ten days for change of address. All communications about subscriptions should be addressed to the Director of Circulation, 330 West 42nd Street, New York (18), N. Y. **Subscription rates**—United States, Mexico and Central and South American countries, $1.00 a year, $1.50 for two years, $2.00 for three years. Canada, $1.50 a year, $2.50 for two years, $3.00 for three years. Great Britain and British Possessions, 12 shillings a year, 36 shillings for three years. All other countries, $2.00 a year, $6.00 for three years. Entered (or reentered) as second class matter December 16, 1936, at the Post Office of New York, N. Y., U. S. A., under the act of March 3rd, 1879. Printed in U. S. A. Cable address: "McGrawhill, New York." Member of A. B. P. Member of A. B. C.

Contents copyrighted 1944 by McGraw-Hill Publishing Co., Inc., 330 West 42nd Street, New York (18), N. Y.

CHANGE OF ADDRESS

McGRAW-HILL PUBLISHING COMPANY
330 West 42nd Street, New York (18), N. Y.

Director of Circulation:

Please change my address on Construction Methods

From .....

.....

To .....

.....

Signed .....

THE JOB JESTER

CARTOONS DRAWN FOR CONSTRUCTION METHODS

"If you're such an expert on bridge construction, I'll give you some bridgework to repair!"

"Better put 'em on now. The big boss will be here any minute."

"They came racing through here at 5 a.m., before we could get out an injunction."

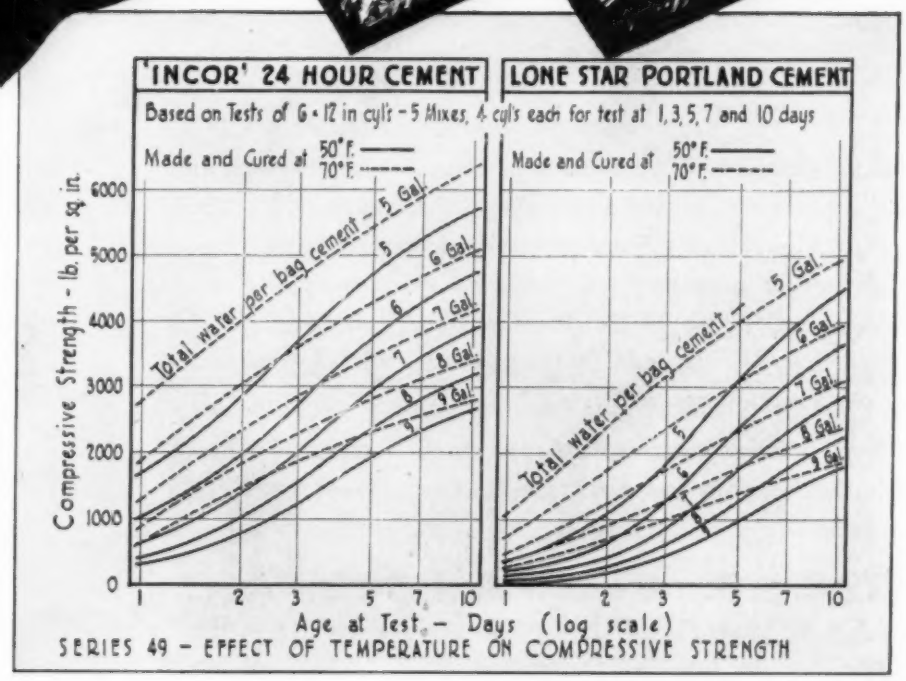
THAT MAN'S HERE AGAIN!

THIS is the in-between season, before those tarps and salamanders are on the job. Fall nights turn cold suddenly. Temperatures often average about 50 degrees . . . retard hardening . . . expose concrete to freezing risk. Now's the time when 'Incor' 24-Hour Cement comes in handy. Without protection, at 50 degrees, 'Incor' concrete attains stripping strength, is safe from sudden freeze, 2 to 3 days sooner. By using 'Incor', you—

MAINTAIN STRIPPING SCHEDULES
PREVENT JOB SLOW-DOWN
SAVE TIME, MONEY, WORRY
GET BETTER CONCRETE

Plan and build with 'Incor'* 24-Hour Cement for quality, speed and economy. Write us at 342 Madison Ave., New York 17, for copy of "Winter Concreting Book."

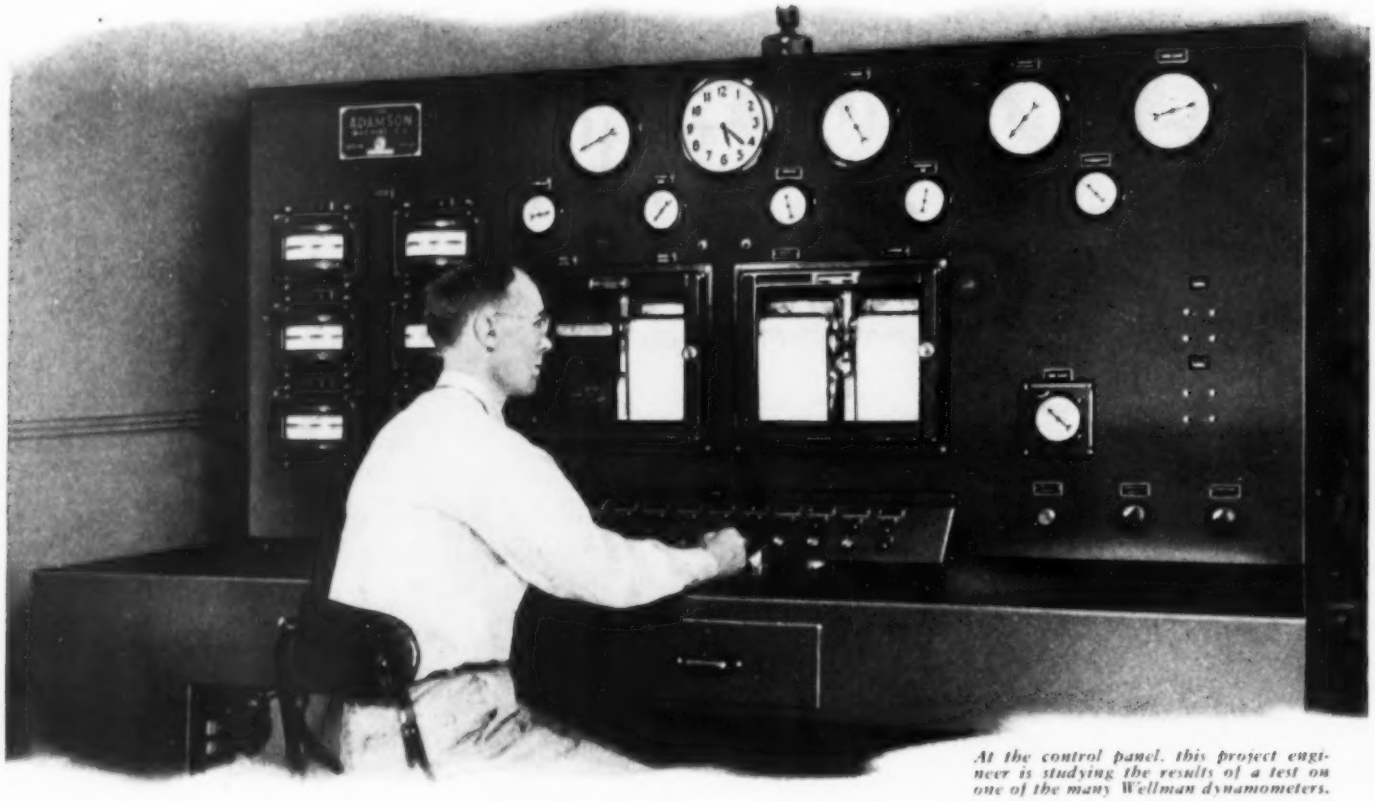
*Reg. U. S. Pat. Off.


'INCOR' 24 HOUR CEMENT
LONE STAR PORTLAND CEMENT
Based on Tests of 6 • 12 in cyl's - 5 Mixes, 4 cyl's each for test at 1, 3, 5, 7 and 10 days
Made and Cured at 50° F. 70° F.
Compressive Strength - lb. per sq. in.
Total water per bag cement
5 Gal.
6 Gal.
7 Gal.
8 Gal.
9 Gal.
Age at Test - Days (log scale)
SERIES 49 - EFFECT OF TEMPERATURE ON COMPRESSIVE STRENGTH

LONE STAR CEMENT CORPORATION

Offices: ALBANY • BIRMINGHAM • BOSTON • CHICAGO • DALLAS • HOUSTON • INDIANAPOLIS • JACKSON, MISS. KANSAS CITY, MO. • NEW ORLEANS • NEW YORK • NORFOLK • PHILADELPHIA • ST. LOUIS • WASHINGTON, D. C.

LONE STAR CEMENT, WITH ITS SUBSIDIARIES, IS ONE OF THE WORLD'S LARGEST CEMENT PRODUCERS: 15 MODERN MILLS, 25-MILLION BARRELS ANNUAL CAPACITY



At the control panel, this project engineer is studying the results of a test on one of the many Wellman dynamometers.

Solving your problems of RUBBING SURFACES

FRICTION is developed when two surfaces are rubbed together. Friction lights a match . . . and it's friction that operates your clutches and brakes. In the great S. K. Wellman laboratories we are engaged in continuous study of powder metallurgy, to improve friction qualities of Velvetouch *all-metal* clutch facings and brake linings . . . to bring you dependable friction materials *engineered to your exact specifications.*

Specify Velvetouch replacement clutch facings and brake linings for your tractors, graders, scrapers, shovels and other earthmoving equipment.

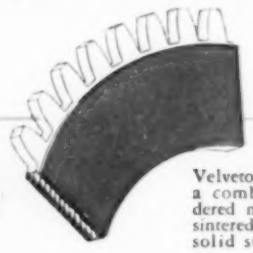
THE S. K. WELLMAN COMPANY
1374 EAST 51st STREET • CLEVELAND 3, OHIO

Interesting Facts About FRICTION

If two rubbing surfaces are separated by a film of oil, the friction is almost independent of the nature of the surfaces.

As shown in the illustration, a 10 lb. block sliding on a non-lubricated surface, requiring 2 lbs. of force, has a .2 coefficient of friction. When the surface is lubricated, however, the force required is only 1 lb. and the coefficient of friction drops correspondingly to 1 As lubrication decreases, the coefficient of friction becomes more dependent upon the material of the surfaces.

For Brake and Clutch . . . Use Velvetouch



Velvetouch is ***all metal***— a combination of powdered metals, compressed, sintered and welded to a solid steel backing plate.

Time saved in loading . . . on the haul road . . . and on the dump or fill . . . means more round trips per hour and more yards or tons moved per day. Rear-Dump and Bottom-Dump EUCLIDS are engineered for off-the-highway service and are economical on both short and long hauls.

Fast, easy loading by modern excavating equipment, coupled with Euclid speed and efficiency on the haul road, is the surest way to cut your hauling costs on all types of jobs. Your Euclid distributor or representative is at your service to provide information and to help with plans for your present or post-war hauling equipment.

A new pictorial booklet "Bottom-Dump EUCLIDS On The Move" is yours for the asking. Write for your copy of this interesting booklet today.

The EUCLID ROAD MACHINERY Co.
CLEVELAND 17, OHIO

EUCLID SELF-POWERED HAULING EQUIPMENT For EARTH . . ROCK . . COAL . . ORE

YOU CAN DEPEND ON LA PLANT-CHOATE

"Know-How"

FOR THE BEST IN TRACTOR EQUIPMENT

When it comes to developing new and better tools for your post-war jobs remember—no other manufacturer in the tractor equipment field can match LaPlant-Choate's 33 years of pioneering leadership. This record is your best assurance of tomorrow's best buys in tractor equipment. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Ia.

1911—LaPlant-Choate started out as a partnership between E. W. LaPlant and Roy Choate—manufacturing horse-drawn stump pullers and house moving equipment.

1919—Introduced a line of trailers with solid disc steel wheels for hauling logs, heavy machinery, etc.

1922—Began manufacturing steel dump wagons with disc steel wheels for hauling dirt behind tractors.

1923—Developed the first tractor-mounted bulldozers to be manufactured on a commercial scale. Original models were hand operated and mounted on Holt and Best tractors, which preceeded "Caterpillar".

1924—Introduced a small two-wheeled hydraulic operated carrying scraper with disc steel wheels for operation in tandem behind tractors.

1925—Developed the first hydraulic operated bulldozers to be produced on a production basis. Also the first tractor-mounted snow plow with both the "V" and wings hydraulically controlled. Became the first company to build earthmoving and snow removal equipment for use exclusively with "Caterpillar" tractors.

1927—Business incorporated April 5, 1927. Introduced a dozer with an angling blade for side casting material.

1929—Introduced a dozer with a tilting blade. Also developed a small hydraulic operated roll-over scraper (Fresno type).

1934—Originated the first front mounted hydraulic pump for use with "Caterpillar" tractors in operating dozers, scrapers and snow plows.

1935-37—Pioneered the first hydraulic operated brushcutters, treedozers, rootcutters and weed eradicators for clearing waste land. Also began manufacturing two-wheeled hydraulic operated scrapers on rubber tires. Introduced the first positive forced ejection hydraulic scraper ever built.

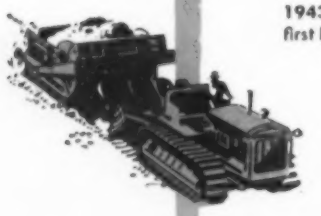
1938—Developed the first successful cable operated carrying scraper to utilize the principle of simultaneous operation of gate and apron in loading and unloading. Also introduced a line of cable operated dozers, rippers and sheepsfoot tamping rollers.

1940—Pioneered the first scraper to dig, carry, dump and spread by means of single valve and jack arrangement. Also developed the first practical inside frame dozer.

1941—Introduced the first hydraulic operated scrapers for use with "Caterpillar" high speed rubber tired tractors.

1942—Originated the first airborne bulldozers and scrapers to be flown in Army transport planes.

1943-44—Became the nation's largest producer of dozers for the armed forces; pioneered first Beach-Dozer and first Tank-Dozer, in cooperation with U. S. Army Engineers and Ordnance.



NOTE: LaPlant-Choate now controls over 120 patents and applications covering both hydraulic and cable operated tractor equipment.

LaPLANT-CHOATE

Earthmoving and Land Clearing Equipment

PUTTING THE PROVE IN IMPROVEMENTS

• *This bucking bronco is a "Caterpillar" Diesel D2 Tractor taking one of the many "hurdles" that are designed to test its toughness on the "Caterpillar" Proving Grounds.*

• *A "Caterpillar" Diesel D4 Tractor pulling a drawbar dynamometer and loading car to test the pulling power of a certain grouser design in various kinds of soil surfaces.*

IF YOU happen to be a long-standing "Caterpillar" Diesel user, you know that changes and improvements go into "Caterpillar" Diesel products the minute they're ready and right. There's never any waiting for "yearly models."

Through the years, "Caterpillar" has given you such notable refinements as copper bellows seals for final drive, oil coolers, absorbent-type oil and fuel filters, finger-tip steering, "Hi-Electro" hardening for many vital parts, multispeed transmissions and scores of others. The economy and dependability of the "Caterpillar" Diesel have been constantly improved. Only the basic design remains unchanged. It was *right* from the start.

Every improvement that has ever gone into a "Caterpillar" Diesel product has first been subjected to the stiffest laboratory and proving-ground tests. The net result is Product Dependability. With every manufacturing step controlled by one organization in one factory, there can be no possibility of compromise with quality.

Dependability is the outstanding characteristic of your "Caterpillar" dealer, too. Today he is in a position to give your "Caterpillar" Diesel equipment the kind of inspection, adjustment, maintenance and repair it needs to work at peak efficiency from now until Victory is won. You'll find it profitable to consult your "Caterpillar" dealer regularly.

Caterpillar Tractor Co., San Leandro, Calif.; Peoria, Ill.

. . .

DEPENDABLE is the word for "Caterpillar" Diesel

CATERPILLAR DIESEL

REG. U.S. PAT. OFF.

TO WIN THE WAR: WORK—FIGHT—BUY MORE WAR BONDS!

F. C. Daugherty,
Duluth, Commissioner of Public Works

"THE MOST VERSATILE MACHINE WE HAVE . . . "

Says Mr. Daugherty about the

ATHEY MOBILOADER

"ANYTIME of the year, you'll find our Athey MobiLoader busy on an important job. It's the most versatile machine in our shop and we're proud of it," writes F. C. Daugherty, Duluth, Commissioner of Public Works.

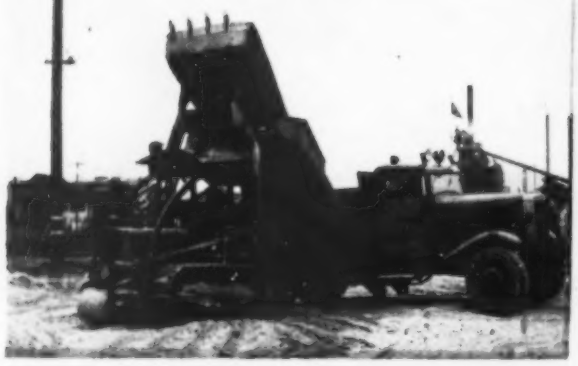
Aggressive Duluth, Minnesota—"the air-conditioned summer-time city"—solves its multitude of loading jobs with an Athey Mobiloader.

Purchased in July, 1942, it has seen month after month of steady service in stock pile loading, grading alleys and sidewalks, street improvement and snow clearing.

Hundreds of Athey MobiLoaders are serving contractors, municipalities, coal mines, sand and gravel plants, U. S. Armed Forces, ore operators, and others today in many localities.

Simplified and improved after four years of performance proof in the field, Athey MobiLoaders are cutting loading costs and increasing loading production.

Why not investigate the Athey MobiLoader for your present "Caterpillar" Diesel D4 or D8 Tractors, in case new tractors are not now available? See your ATHEY-"Caterpillar" Dealer today, or write Athey Truss Wheel Co., 5631 W. 65th St., Chicago 38, Illinois.



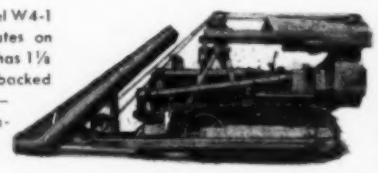
BUSY THE YEAR 'ROUND, the City of Duluth's Athey MobiLoader handles all materials from gravel to snow.

☆

ATHEY

IMPROVED MOBILOADER

Here is the new, improved Model W4-1 Athey MobiLoader. It operates on the "Caterpillar" D4 Tractor, has 1⅛ cubic yard bucket capacity. It's backed by 4 years of performance—hundreds of job-proved machines.



Don't let a "LAZY" oil JUNK your equipment...

keep engines on the "GO" with hard-working TALPEX

Equipment is going to the scrap heap fast enough without speeding the trip with a "lazy" oil.

Under normal operating conditions a "lazy" oil might get by. But today, when engines are being worked twice as hard and their operation is twice as important, no operator can afford to take chances with a "lazy" oil . . . one that doesn't have *all* the properties needed to do a complete job of lubrication.

You can't tell whether or not an oil is "lazy" until you give it a job to do. Then it's too late. But of one thing you can be certain; to keep your equipment operating at peak efficiency the oil you trust with the job of lubricating your engines must have *all* of the following properties of new Shell Talpex.

NEW SHELL TALPEX

—**IS NON-CORROSIVE TO ALLOY** bearings. Protects all lubricated engine parts against corrosion.

—**HAS EXCEPTIONAL OXIDATION STABILITY.** Holds to a minimum the formation of sludge, lacquer and other products of deterioration.

—**HAS HIGH DETERGENCY.** Helps keep carbon, lacquer and foreign particles from adhering to pistons and rings, valves, ports.

—**HAS LOW CARBON-FORMING TENDENCY.** Reduces ring sticking and wear. Lengthens engine life.

If the oil you now use doesn't have *all* these properties, it's lazy . . . should be changed to hard-working Shell Talpex. Ask the Shell man to show you why.

SHELL

TALPEX

THE NEW, ALL-PURPOSE, HEAVY-DUTY LUBRICANT

For trucks, buses, tractors, shovels, stationary and marine Diesels

What a DRILLING CONTRACTOR *Thinks of*

MIR-HARD FACING RODS-COL

AUSTIN BOARDMAN

E. R. BOARDMAN

BOARDMAN MACHINE WORKS
Drilling Contractors
Electric Welding and All Kinds of Machine Works
Oil Well Supplies

GALLUP, NEW MEXICO July 15, 1944

Mir-O-Col Alloy Co.
Los Angeles,
California

Dear Sirs:

On our last two wells which we drilled for the Town of Gallup the first one was 310 ft., and we used your Mir-O-Col Hardfacing Production Rod, hard-facing the 12in. Bit only three times, drilling in Ironstone Quartz, Red Sandstone and Shale.

On the last well, which was 325 ft., was Quicksand and Red Sandstone. While drilling in the Red Sandstone, one of the men dropped a 4 pound steel hammer in the hole and this was drilled up without any effect on the cutting edge of the Bit which was hard-faced with your Mir-O-Col Production Rod. The 12 in. Bit was hard-faced only 2 times in drilling this well.

Thanking you for dropping in to see us on your first trip through this territory, we are,

Yours truly,
Boardman Machine Works
By M. L. Mason
M.L. Mason

Loss of operating time can be reduced to a minimum by using Mir-O-Col hard facing rods on equipment parts subject to extreme conditions of wear from abrasion, friction and impact. Hard facing may be the solution to YOUR maintenance problem. The "know-how" of our technical staff is at your service and any request for information will receive prompt attention.

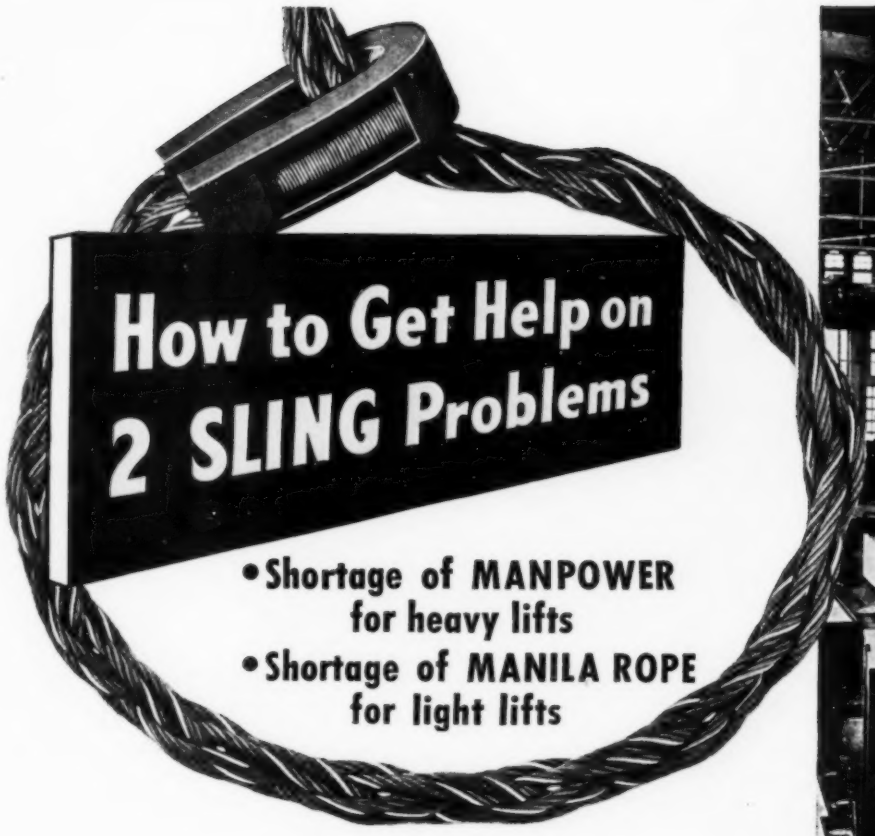
Priority no longer required for purchase or use of Mir-O-Col hard facing rods.

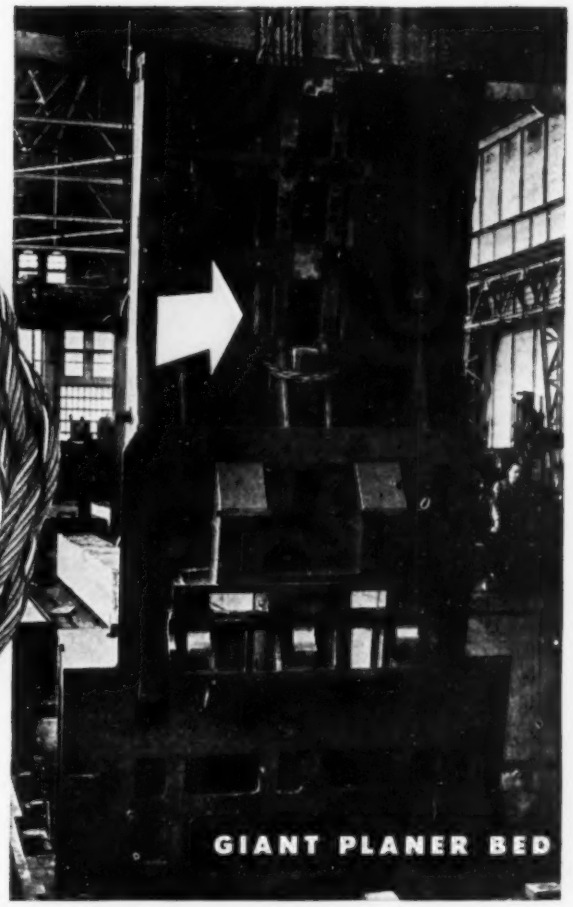
"There's Nothing Accidental About Quality"

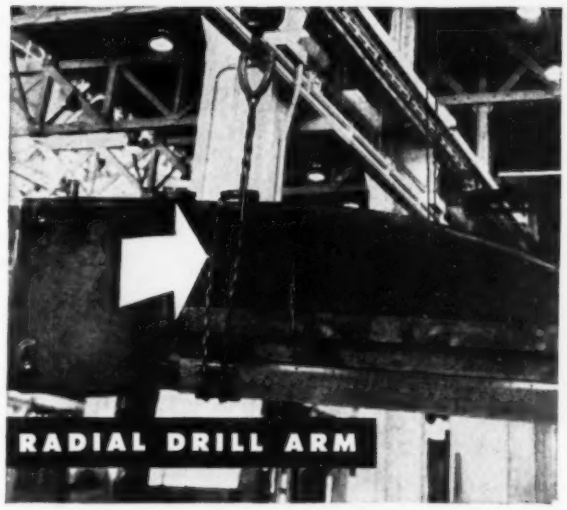
Just off the Press!
Bulletin MHF-201
WRITE FOR YOUR FREE COPY

MIR-ALLOY HARD FACING MAC RODS COMPANY-COL

2416-34 EAST 53rd STREET
LOS ANGELES 11, CALIFORNIA







Would it help you, on a 20- or 25-ton lift, to have a sling that *one* man could handle, instead of two or three? Light weight is just one work-speeding advantage of Yellow Strand Braided Wire Rope Slings.* They're easy to attach . . . kink-resistant . . . free from corkscrewy effects—all because the patented braiding makes them flexible and relaxed. Still they possess the strength and uniformity of tough Yellow Strand Wire Rope. Employees like this *security*.

Not all sling difficulties have been problems of manpower or heavy loads. Many *light* sling users, deprived of Manila rope, are discovering that versatile Braided Yellow Strand Slings are pliable . . . responsive . . . safe for handling fragile, slippery or highly finished objects. Again it's the patented braiding that provides a soft, sure grip. As you check the wartime efficiency of your sling methods, let Broderick & Bascom's specialized Sling Engineers be of service. Write now.

Broderick & Bascom Rope Co., Saint Louis

Branches: New York, Chicago, Houston, Portland, Seattle
Factories: St. Louis, Seattle, Peoria

*Patents: U.S., 1475859, 1524671, 2142641, 2142642, 2299568; Canadian, 252874, 258068

Riggers' Hand Book—Shows sling types, fittings, capacities. Send for FREE copy.

YELLOW STRAND

Braided Wire Rope SAFETY SLINGS

BRODERICK & BASCOM

Using a "99-M", with finisher and loader attachments, to clear a path for a railway through the heart of the Brazilian jungle.

As the work progresses, the blade plows a windrow of dirt for the loader attachment to pick up and load into trucks.

TOUGH JOB CHAMP

Take any job on which there are motor graders of various types . . . a job on which there is real pioneering to be done . . . in rocks, sand or mud . . . or on steep slopes. Which machine do you find up front where the going is roughest and toughest? The Austin-Western 99-M Power Grader.

IT HAPPENS EVERY TIME . . . and there's a good reason. No other motor grader can match the all-around, rough-and-tumble performance made possible by the 99-M's exclusive All-Wheel Drive and All-Wheel Steer.

Your nearby A-W Distributor will be glad to tell you the whole story.

AUSTIN-WESTERN COMPANY, AURORA, ILLINOIS, U. S. A.

BUILDERS OF ROAD MACHINERY

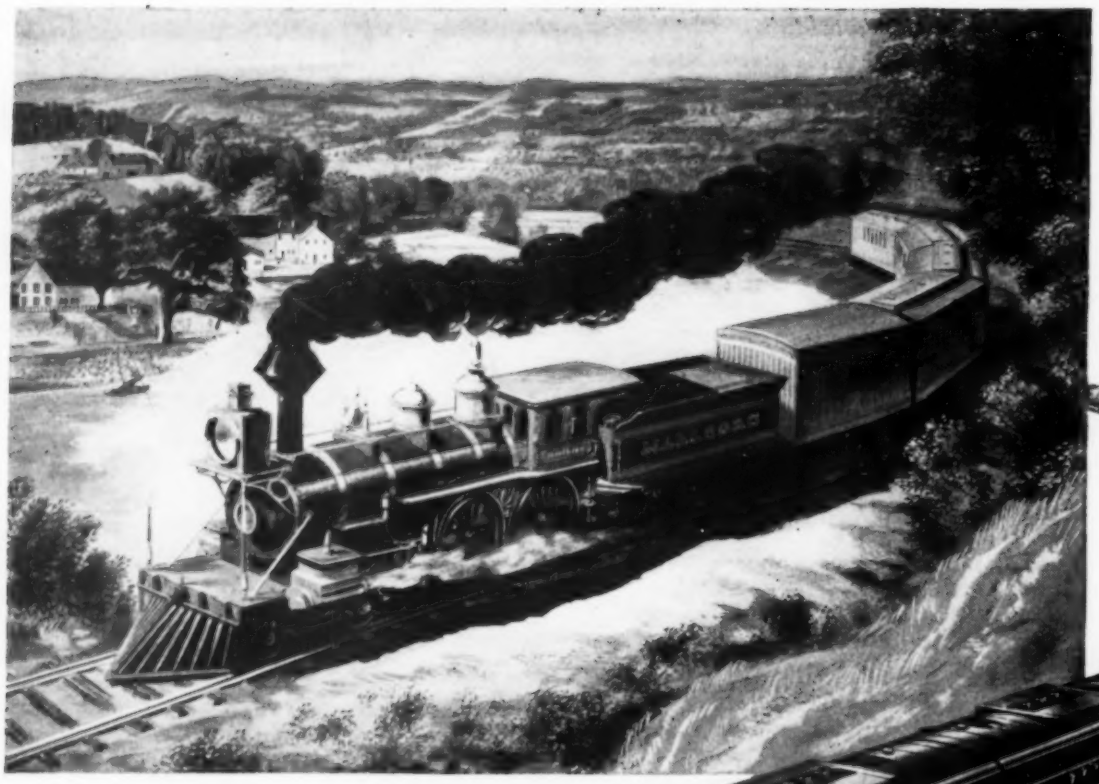
Austin Western

SINCE 1859

BUY MORE WAR BONDS

Building a road through blow-sand, where the ordinary motor grader cannot travel with blade empty, let alone work.

All-Wheel Drive and All-Wheel Steer are responsible for this beautiful job of sloping a steep bank of wind-blown soil.



Back in the 60's, locomotives such as the Marlboro of the Boston & Maine Railroad puffed through the Berkshire Hills of Massachusetts, to give the New England of those days the latest in transportation.

Today, 5400-H.P. Diesel locomotives—newest and largest railroad motive power in use on any New England road—haul as many as 125 freight cars at former passenger-train speeds. They are introducing another new era in New England railroading. They have aided greatly in keeping New England warm with their loads of precious oil and coal.

HERALD OF TRANSPORTATION'S FUTURE

IN the spectacular job America's railroads are doing there is a design for finer future transportation.

It centers upon the performance of the General Motors locomotive.

Part of this performance lies in this locomotive's work. It is quick to get away—carries through its job with few or no stops for service—gets there on clipped schedules.

In run after run these locomotives are hauling heavy freight faster than passengers were carried a few years back.

These achievements are elements in railroad progress. They are forerunners of a great new era of transportation efficiency in the days which lie ahead.

KEEP AMERICA STRONG BUY MORE WAR BONDS

GM
GENERAL MOTORS
DIESEL POWER

LOCOMOTIVES . . . . . **ELECTRO-MOTIVE DIVISION,** La Grange, Ill.

ENGINES . . 150 to 2000 H.P. . . . CLEVELAND DIESEL ENGINE DIVISION, Cleveland 11, Ohio

ENGINES . . . 15 to 250 H.P. . . . . DETROIT DIESEL ENGINE DIVISION, Detroit 23, Mich.

THREE big reasons for the outstanding performance of Lorain Draglines are (1) Balanced, big capacity turntable with Center Drive power transmission, engineered to develop higher hoist line speed and more "dirt-digging" pull and power—(2) Patented "cable-miser" Fairlead that improves dragline operation, increases hours of cable life, reduces maintenance costs—(3) Husky, 2-speed Chain Drive Crawler, easily maneuverable, agile and "sure-footed" in soft ground or cross-country travel.

Lorain Draglines—planned for postwar—will have many more advantages worth investigating. Be sure to see your Lorain distributor and discover why Lorain Draglines fill the bill for moving dirt, HIGH . . . WIDE . . . and produce HANDSOME profits.

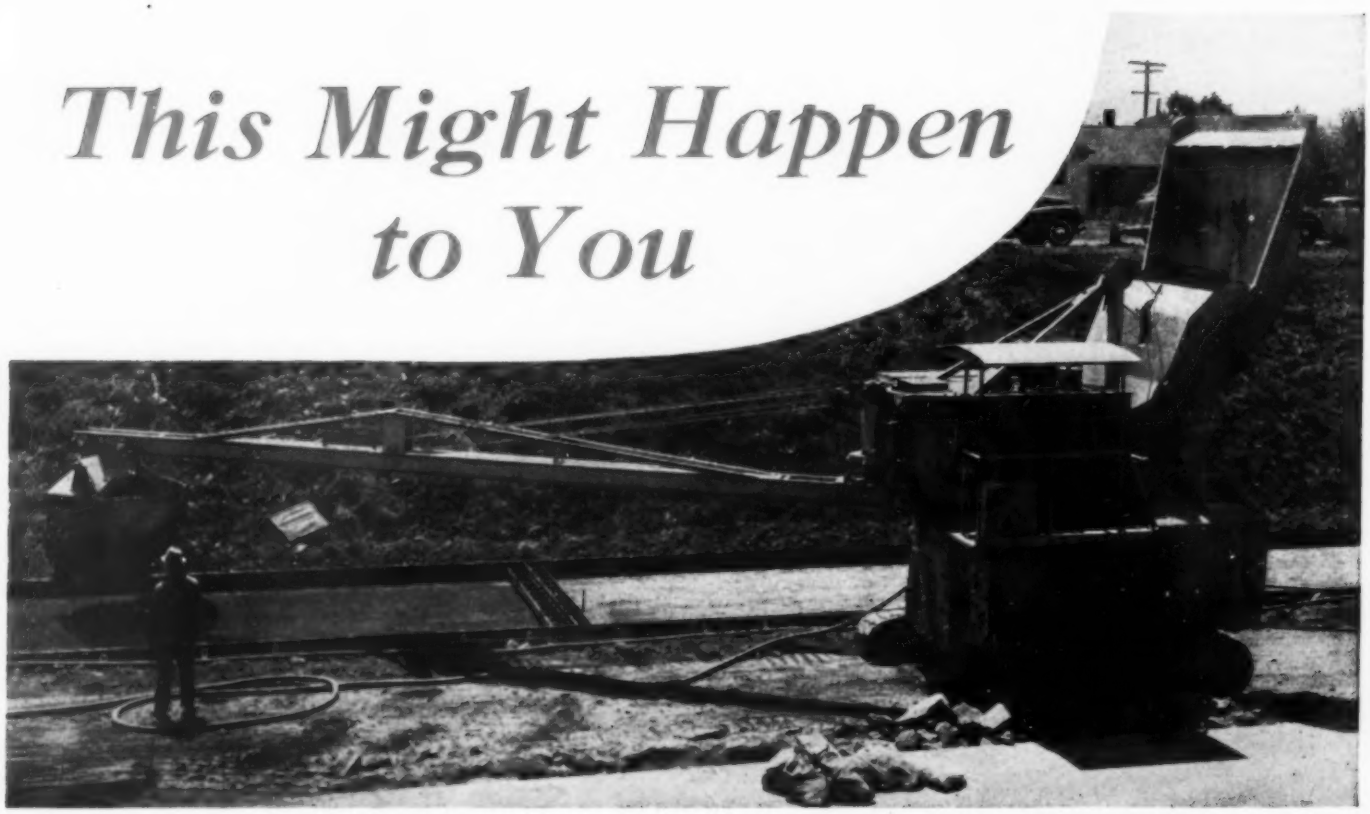
THE THEW SHOVEL COMPANY • LORAIN, OHIO

Reg. Trade Mark

thew-Lorain

CRANES • SHOVELS • DRAGLINES • MOTO-CRANES

This Might Happen to You



SNAP!! —a vital part just gave way on this important job. It looked like a 10 day delay if the part had to come all the way from the factory. The contractor faced a $600 rental loss and besides, the job would be behind schedule by some 3840 yards of concrete.

But thanks to a nearby A. E. D. member the part was replaced within 8 hours. The contractor lost only $60 rental cost and the job was set back only 384 yards.

Unexpected things like this happen to the best of machinery but when they do, remember, the manufacturers have wisely made sure their machinery is distributed and serviced by reliable Associated Equipment Distributors. More than 500 A. E. D. members are ready to give you "Neighborhood Service" and have the proper facilities to repair or rebuild quickly and locally any piece of their equipment that gives way under extra wartime abuse.

Learn to know your nearest A. E. D. Members and use their services.

Look for the A. E. D. Emblem of Good Service

ASSOCIATED EQUIPMENT DISTRIBUTORS
MEMBER

ASSOCIATED EQUIPMENT DISTRIBUTORS

NATIONAL PRESS BUILDING • WASHINGTON, D. C.

LOOK FOR THE A.E.D. INSIGNIA—THE SYMBOL OF GOOD SERVICE

Nitro Starch Base

High Explosive Efficiency

IN MINING · QUARRYING · LOGGING AND CONSTRUCTION

1 WILL NOT PRODUCE HEADACHES from handling . . . reduces discomfort from breathing muck pile fumes. Better working conditions for you and your men!

2 WILL NOT FREEZE or leak at Arctic or Tropic temperatures. Maintained high efficiency . . . anywhere . . . anytime!

3 WITHSTANDS IMPACT in high-powered Rifle Bullet Test. Greater safety for workers!

★ Today, Trojan Products are helping our fighters blast out critical gains on the roads to Berlin and Tokyo. Efficient weapons of war, Trojan Products are better known for their outstanding performances in peacetime development and construction. More than ever before, those who will use explosives in postwar are depending on Trojan for . . . "the right explosive for the job".

SPEED THE PEACE • BUY MORE BONDS!

EXPLOSIVES 1905 TROJAN 1944 CHEMICALS

POWDER COMPANY

ONE OF AMERICA'S OLDEST HIGH EXPLOSIVES MANUFACTURERS

PLANTS SEIPLE, PA. • ROBERT, CAL. • MAGAZINES STRATEGICALLY LOCATED THROUGHOUT THE NATION

OFFICES: ALLENTOWN, PA. • SAN FRANCISCO, CAL. • LOS ANGELES, CAL. • PORTLAND, ORE. • NEW YORK, N. Y.

Tournapulls are quickly pusher loaded. Single pusher easily handles loading of 3 or 4 Tournapulls, depending on haul length.

HOW TO REPLACE OBSOLETE RIGS and *Reduce Equipment Investment*

USE FAST - MOVING TOURNAPULLS . . . You'll Load, Haul and Spread with Same Rig . . . Move More Yardage Faster and at Less Equipment and Labor Cost

With Tournapulls you get Carryall Scraper digging and spreading efficiency plus truck hauling speeds. You eliminate such one-purpose tools as shovels and elevating graders for loading, trucks for long hauls, and special spreading tools on fills. Result: you cut equipment investment almost in half, move more yardage with fewer operators and fewer units.

MORE POWER FOR WEIGHT

The Super C Tournapull has 150 h.p., yet weighs but 31,000 lbs.—22,500 to 39,000 lbs. less than crawler-scraper outfits of comparable output capacity. And Tournapull design centers that weight and power on two big rubber-tired drive wheels to give you maximum traction and flotation for tough grades and soft underfoot conditions. These big drive tires have practically no wearing parts, reduce your maintenance costs and downtime by cushioning equipment against shock.

HAUL FROM 300' to 3 MILES PROFITABLY

What's more, the Super C operates at 2.6 to 14.9 m.p.h.—2 to 3 times faster than the fastest crawling tractors. With it you can move dirt cheaply on both long and short hauls—from 300' to 3 miles.

Why use slow-moving, overweight equipment when you can move more yardage, more profitably with faster-moving, job-proved Tournapulls? Talk to your LeTourneau dealer NOW about replacing obsolete equipment with faster-powered Tournapulls.

Tournapulls spread their own loads on the move. Smooth fills and good haul roads, as shown here on Mannix & Company's job near Banff, Alberta, enable you to get into high gear quicker and stay there, thus increase hourly trips and yardage.

LETOURNEAU TOURNAPULLS

PEORIA, ILLINOIS · STOCKTON, CALIFORNIA

Also LeTOURNEAU (Aust.) Pty., Ltd., Rydalmere, N.S.W., Australia.

Manufacturers of TOURNAPULLS*, DOZERS, CARRYALL* SCRAPERS, POWER CONTROL UNITS, ROOTERS*, SHEEP'S ROOT ROLLERS, TOURNAROPE*, TOURNATRAILERS*, TOURNAWELD*, TOURNACRANES*, *Trade Mark Reg. U.S. Pat. Off.

JOB-PROVED BY ALERT EARTHMOVERS

2000 RU[illegible]PPED

RUBBER-TIRED POWER FOR FASTER EARTHMOVING

Double Duty ROAD BUILDER

LOGGING road or super-highway . . . to speed the double job of breaking and leveling the surface, contractors employ powerful combinations like this Diesel Caterpillar teamed with a LeTourneau Rooter and Angledozer.

But Diesels and heavy-duty gasoline engines can give and maintain top performance only if they are effectively lubricated. So contractors everywhere make sure their lubrication is right by using Texaco.

Texaco Ursa Oil X★★, for example, is an additive type heavy-duty oil that is both detergent and dispersive. Its detergency keeps piston rings free and engine parts clean. Its dispersive ability holds deposit-forming materials in suspension until drained at oil change. *Ursa Oil X*★★ protects alloy bearings and prevents scuffing of rings, pistons, cylinders.

For quieter-running, longer-lasting transmission and differential gears, use Texaco gear lubricants.

Texaco lubricants have proved so effective in service they are definitely preferred in many fields, a few of which are listed at the right.

Texaco Lubrication Engineering Service is available to you through more than 2300 Texaco distributing points in the 48 States.

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

THEY PREFER TEXACO

★More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.

★More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

★More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.

★More locomotives and railroad cars in the U. S. are lubricated with Texaco than with any other brand.

★More revenue airline miles in the U. S. are flown with Texaco than with any other brand.

TEXACO

TEXACO Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

TUNE IN THE TEXACO STAR THEATRE EVERY SUNDAY NIGHT—CBS ★ HELP WIN THE WAR BY RETURNING EMPTY DRUMS PROMPTLY

"MEASURED AIR" PROVIDES

- MORE POWER
- LONGER LIFE
- LESS OPERATING COST
- **MORE WORK DONE FASTER**

Thor

"AIR ECONOMY"

FIGURED IN YOUR POST-WAR EQUIPMENT PLANS WILL SAVE YOU TIME, CUT COSTS . . . GET TOMORROW'S JOBS STARTED FAST AND MOVING!

THOR SUMP PUMP

A governor-actuated valve that controls speed and capacity from idling through various capacities up to maximum provides this same feature of "air economy" in the Thor Sump Pump.

THOR PAVING BREAKERS

Thor Paving Breakers, light, medium and heavy duty models, are equipped with the same "measured air" type of short-travel tubular valve as Thor Rock Drills.

The Paving Breaker valve actuates a block type piston, powering it with exactly the quantity of air required for both the forward and return strokes . . . minimizes vibration . . . makes the machine easy to handle.

HOW *Thor* "MEASURED AIR" ECONOMY WORKS!

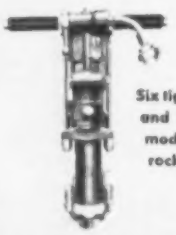
Short-travel valve action is the real secret behind Thor "measured air" economy.

The shorter the travel, the more *positive the action* of the valve in admitting to the tool only the required amount of air—in instantly sealing the inlet against excess air.

Short-travel action *reduces wear* on the valve, retains positive "measure" of air for a greatly extended period of service.

Short-travel valve action powers each stroke of the tool with the same quantity of air—providing *smooth, uniform operation.* Elimination of *excess* air keeps out of the channel the overload of power that staggers the stroke and causes vibration.

THOR ROCK DRILLS



Six light, medium and heavy duty models for all rock formations.

THOR DRIFTER ROCK DRILLS

One light, and one medium weight model, hand or power feed, for all hard rock drifting.

THOR STOPER ROCK DRILLS

One medium, and one heavy duty model for stoping under all drilling conditions.

THOR PAVING BREAKERS

Four light, medium and heavy duty models for all demolition work.

THOR CLAY AND TRENCH DIGGERS

One light, medium and heavy duty model of each for all tunnel and wall work.

WITH ALL THESE

Thor CONTRACTORS' AIR TOOLS!

THOR CLAY DIGGERS

Air that powers the stroke of Thor Clay and Trench Diggers is measured by a new short-travel cylinder "rocker" valve which provides *perfect sealing and control* of required pressure for driving the piston.

THOR BACKFILL TAMPERS

A simple, efficient short-travel "rocker" valve powers the Thor Backfill Tamper with minimum air consumption, developing a balanced stroke that tamps for keeps."

The maximum power, balanced stroke and ease of handling provided by exclusive Thor *"measured air"* construction is available in every one of these Thor Contractors' Air Tools to save you time and operating costs on *all* construction jobs.

THOR ROCK DRILLS

A short-travel tubular valve, heat-treated for durability and precision-ground for perfect fit, "measures" air that powers all three types of Thor Rock Drills—Sinkers, Drifters and Stopers.

Only the precisely-governed quantity of air required can enter any of these drills—controlled with .0002" between the valve flange and chest shoulders through which the air enters and returns.

This precise control of air consumption provides steady power and smoothness in the *automatic rotation* of these drills. *Controlled air* driving the piston gives the steel on the working end maximum forward and rotative action . . . assures fast drilling speed!

All these advantages of "air economy" are but part of the operating and money saving benefits you get with Thor Air Tools. For particulars about *automatic rotation . . . cushioned action . . . automatic lubrication . . . exclusive retainer design,* and many other Thor features, write today for Catalog No. 42-A.

THOR SUMP PUMPS

One current model, designed for all jobs under most unfavorable conditions.

THOR BACKFILL TAMPERS

One light and one heavy duty model for tamping clay and other stiff materials.

Thor *Portable Pneumatic and Electric Tools*

INDEPENDENT PNEUMATIC TOOL COMPANY

600 W. JACKSON BOULEVARD, CHICAGO 6, ILL.

Branches in Principal Cities

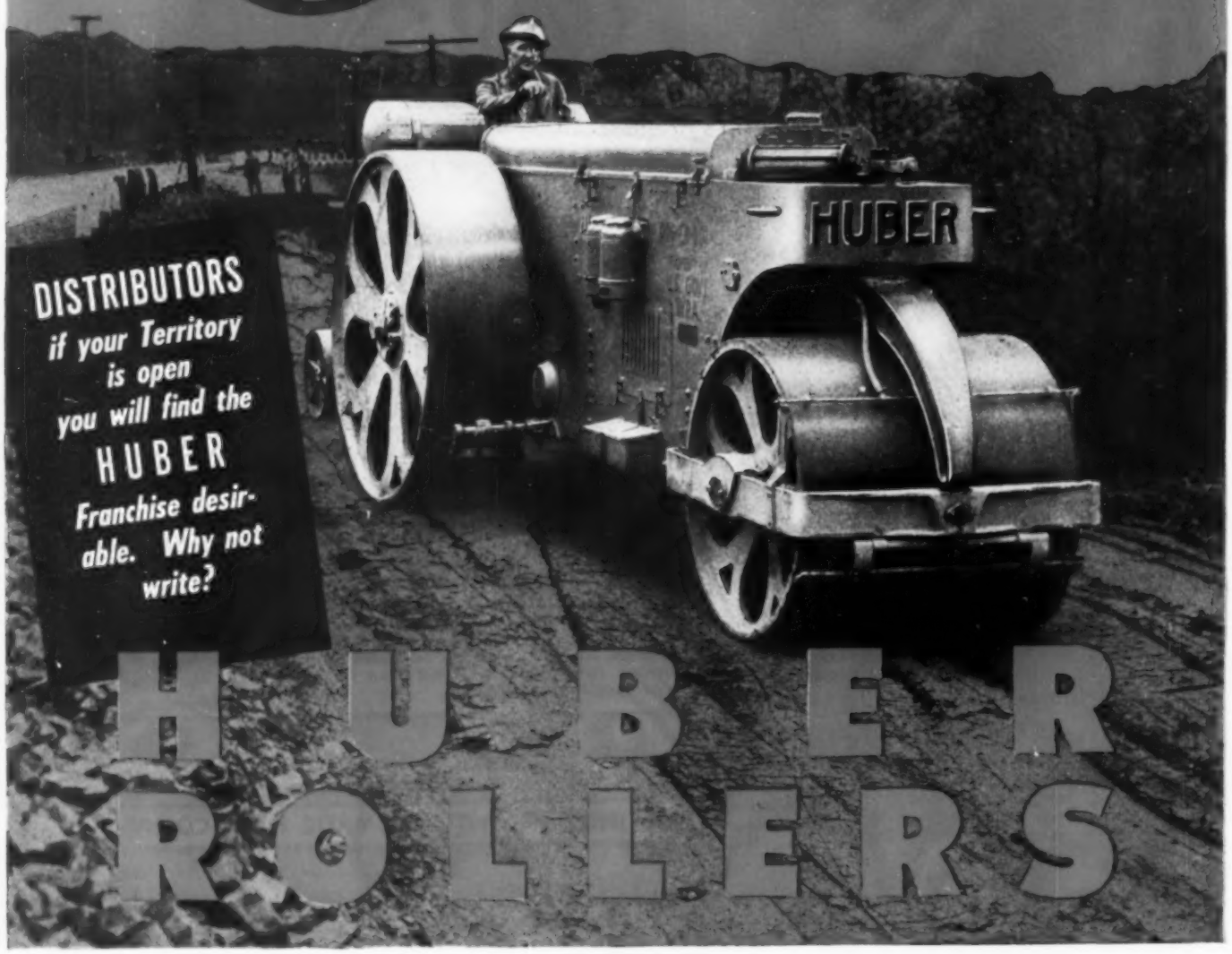
ARE YOU ALL SET FOR V DAY?

HUBER is . . . . . with a Road Roller that has had every feature tested and proven under the most severe of operating conditions.

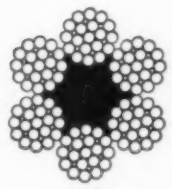
This new HUBER Road Roller, which is giving such a good account of itself in the war zones, will be available to you as soon as the war ends.

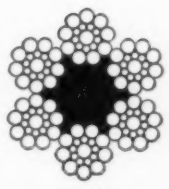
To appreciate it—WAIT AND SEE IT!

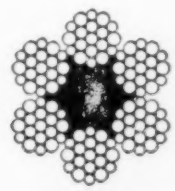
THE HUBER MFG. COMPANY • MARION, OHIO, U. S. A.

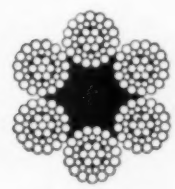


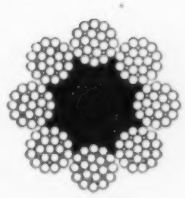
HERCULES • RED-STRAND • HERCULES • RED-STRAND • HERCULES • RED-STRAND • HERCULES • RED-STRAND • HERCULES

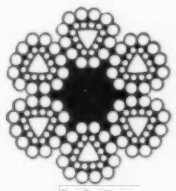

6x19
Filler Wire


6x19
Seale

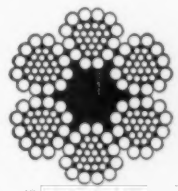

6x19
Warrington

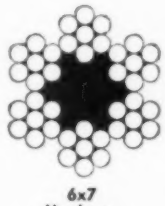

6x37
Extra Flexible

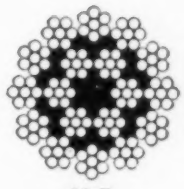

8x19
Extra Flexible

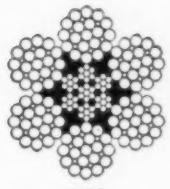

Style B
Flattened Strand

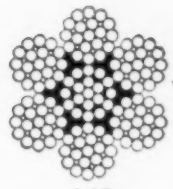
WIRE ROPE
DESIGNED
for your
HEAVY DUTY JOBS

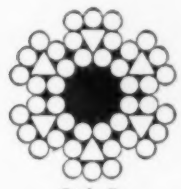

Style G
Flattened Strand


6x7
Haulage


18x7
Non-Rotating


6x19
Wire Rope Center


6x19
Metallic Core


Style D
Flattened Strand

"HERCULES" is our trade name for the very best heavy duty wire rope that we are able to produce. Best in quality . . . best in design . . . best in fabrication. So that it can be recognized by sight, it is always made with one Red Strand.

As "heavy-duty" service covers a wide range of working conditions, this wire rope is manufactured in numerous constructions, as illustrated above. Most of these constructions can be furnished in either a hemp center, a wire rope center or a metallic core.

Preformed: "HERCULES" Red-Strand Wire Rope is furnished either Preformed or Non-Preformed. Under any conditions, the Preformed is easier and quicker to install and safer to handle. For most purposes it is decidedly longer lasting.

In "HERCULES" there is a *Right* rope for every heavy-duty purpose. You will make no mistake if you let the Red-Strand be your Wire Rope Guide. Its use will help you save time . . . reduce operating cost . . . increase safety.

Maximum wire rope efficiency is obtained only when the rope used is of the construction, grade and type best suited to the particular conditions under which it is to work. Ability to make proper selection comes with experience. We shall be glad to have you consult with us on any wire rope problem you may have.

MADE ONLY BY

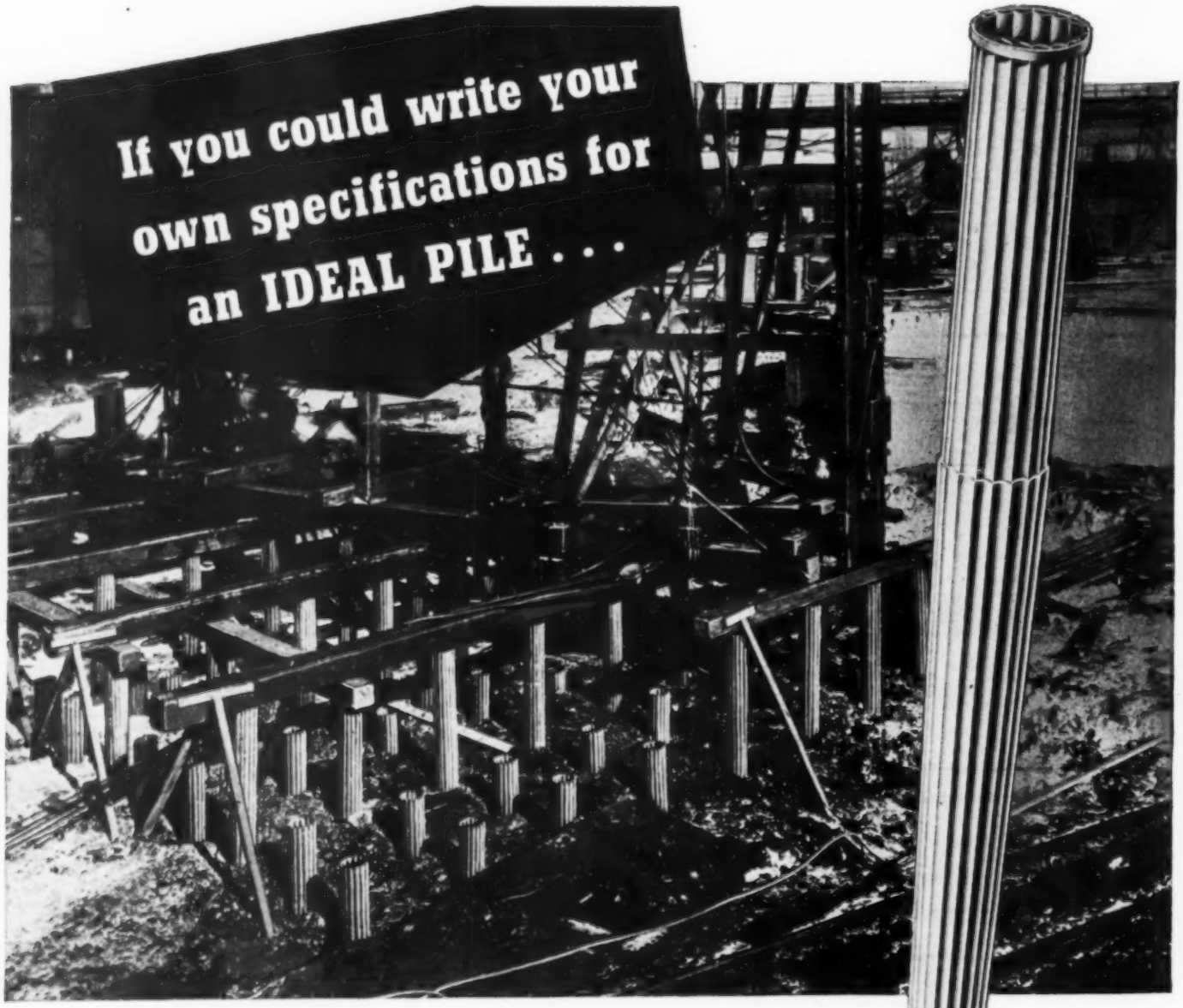
A. LESCHEN & SONS ROPE CO.

WIRE ROPE MAKERS — ESTABLISHED 1857

5909 KENNERLY AVENUE — ST. LOUIS, MISSOURI, U. S. A.

NEW YORK . . . 90 West Street
CHICAGO . . 810 W. Washington Blvd.
DENVER . . . 1554 Wazee Street

SAN FRANCISCO . . 520 Fourth Street
PORTLAND . . 914 N. W. 14th Avenue
SEATTLE . . 3410 First Avenue South

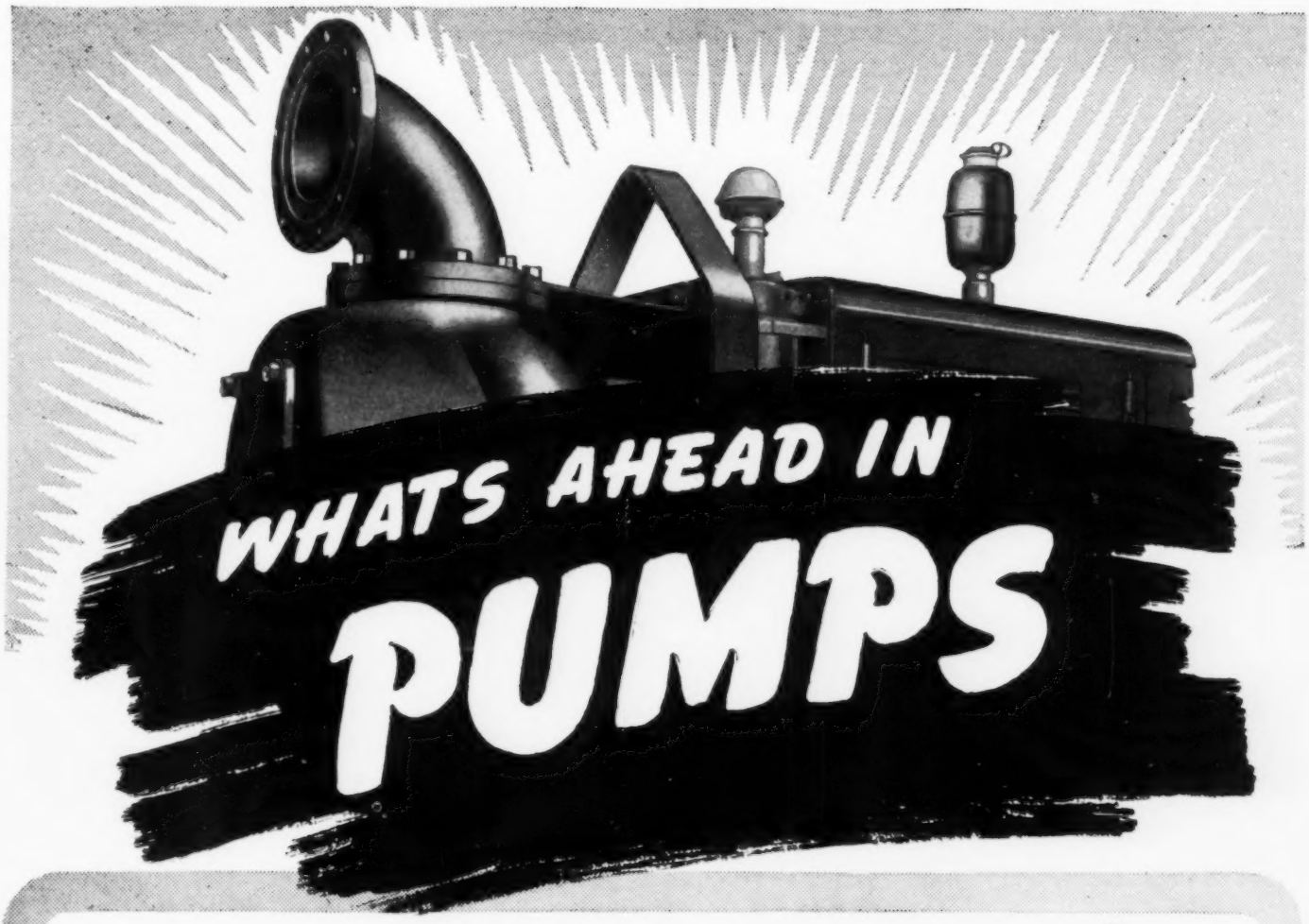


What more would you want than this?

ON thousands of jobs . . . large buildings, bridges, wharves, highway overpasses, and airports . . . Monotube tapered piles have proved themselves the last word in modern cast-in-place piled foundations. These strong, light-weight steel piles go down faster, handle easier, and lend themselves to quick, sure inspection before concreting. Tapered, cold-rolled construction gives them extra strength without extra weight. They can be driven with average job equipment . . . and *quickly extended* on the job to meet varying soil conditions. Available in a gauge, size, and taper to meet any requirement. The services of our consulting engineers are available now as always. Also, write for Catalog 68A. The Union Metal Manufacturing Company, Canton 5, Ohio.

UNION METAL

Monotube Tapered Piles



HIGHER EFFICIENCY . . . BIGGER CAPACITY . . . MORE FEATURES BETTER PERFORMANCE . . LOWEST COST PER GALLON PUMPED . . . 100% SELF-PRIMING . . . NEW DURABILITY AND STAMINA

Yes, there's a lot to look forward to, and you won't be disappointed. Sensational new CMC Dual Prime CENTRIFUGALS are serving Uncle Sam now — available to all soon! There's a new era in pumps dawning and out in front will be CMC!

GET ADVANCE INFORMATION NOW!

CONSTRUCTION MACHINERY CO.
WATERLOO • IOWA

Watch

For the Latest in

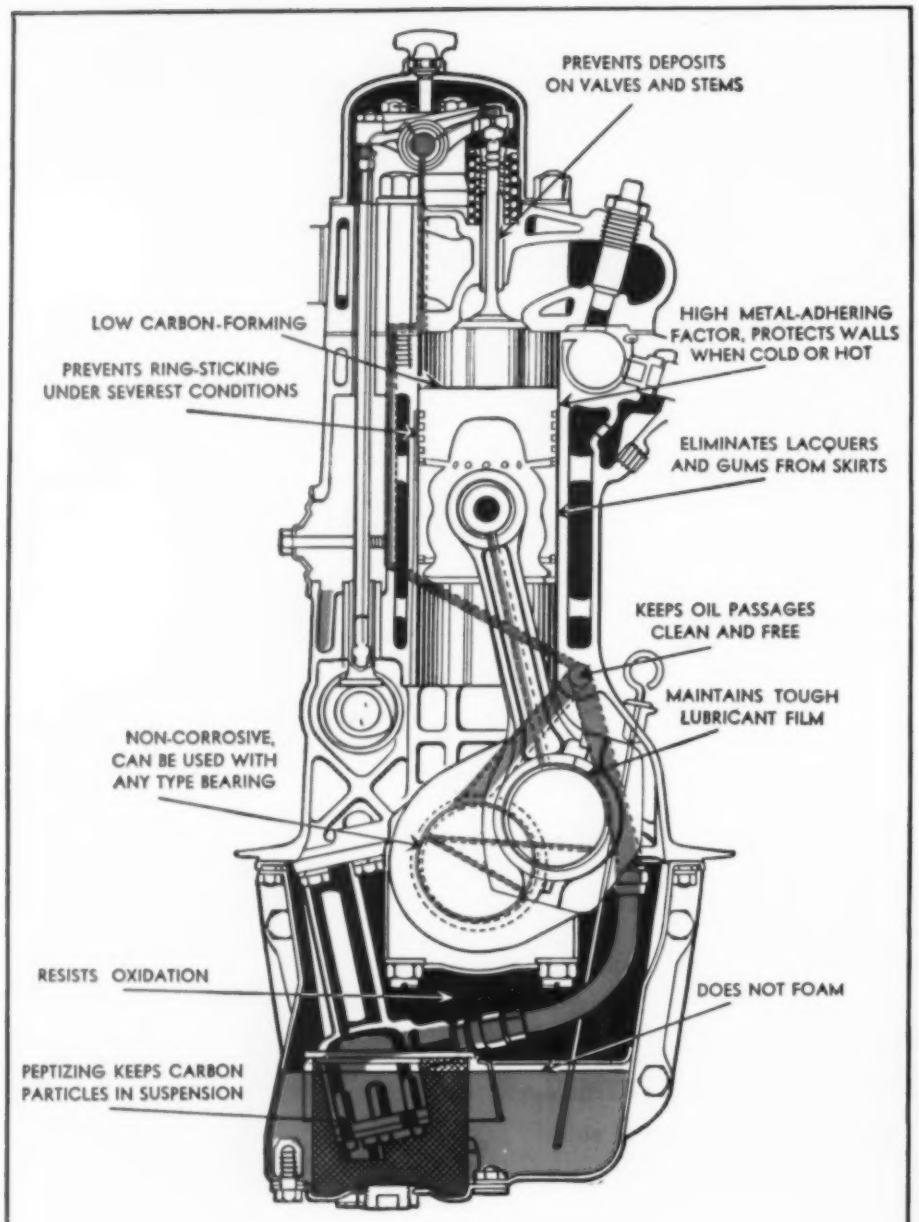
PUMPS . . MIXERS . . CONCRETE GUNS . . BATCHING AND PLACING EQUIPMENT . . HOISTS . . POWER SAWS . . CARTS AND BARROWS!

TYPICAL DIESEL LUBRICATION PROBLEMS:

4. Removal of Deposits from Engines

RPM DELO will clean your engine of sludge and other deposits, even in the ring-belt, unless accumulations of carbon, gum, varnish, etc., have cemented rings so tightly that oil cannot get behind them. The following procedure is recommended for purging conventional engine systems:

1. Drain present oil from crankcase while hot.
2. Renew filter element to trap abrasive particles that may be carried in circulation during purging.
3. Fill crankcase with RPM DELO.
4. Run engine at fast idle for two hours, maintaining water jacket temperature of approximately 200° F. minimum.
5. Drain again while hot and refill with RPM DELO.
6. Place engine in regular service and drain at one-half normal drain period or 750 miles, whichever comes first, for two or three drains. Check oil frequently as removal of deposits may temporarily increase oil consumption.
7. Drain while hot. Check oil filter and replace when necessary.
8. Refill with RPM DELO, returning to regular oil drain and filter change period, and continue to use RPM DELO.


PREVENTS DEPOSITS ON VALVES AND STEMS
LOW CARBON-FORMING
PREVENTS RING-STICKING UNDER SEVEREST CONDITIONS
HIGH METAL-ADHERING FACTOR, PROTECTS WALLS WHEN COLD OR HOT
ELIMINATES LACQUERS AND GUMS FROM SKIRTS
KEEPS OIL PASSAGES CLEAN AND FREE
MAINTAINS TOUGH LUBRICANT FILM
NON-CORROSIVE, CAN BE USED WITH ANY TYPE BEARING
RESISTS OXIDATION
DOES NOT FOAM
PEPTIZING KEEPS CARBON PARTICLES IN SUSPENSION

This diagram of a typical Diesel engine shows how RPM DELO keeps rings free and maintains clean operation.

RPM DELO is made from base oils especially selected for non-deposit-forming characteristics, and contains a detergent which keeps foreign particles in suspension. It also contains an anti-oxidant which prevents the formation of gums and lacquers. It is non-corrosive, may be used with any type of bearing.

RPM DELO has world-wide distribution and is marketed under the following names: RPM DELO, Caltex RPM DELO, Kyso RPM DELO, Signal RPM DELO, Sohio RPM DELO, and Imperial RPM DELO (Concentrate). Ask your Diesel engine manufacturer or distributor for the name of the RPM DELO supplier in your vicinity.

The typical cleanliness of engine parts when RPM DELO is used is illustrated by this oil filter removed from an engine used in heavy duty Diesel bus service for 50,000 miles. Oil pump screen and valve chamber were comparably clean.

RPM DELO

STANDARD OF CALIFORNIA

Digging An Axis Grave

An American Bullgrader digging, literally, an Axis grave is symbolic of the jobs dirt-moving equipment has done to speed complete Victory. On every front, the work of bulldozers, Dozershovels, scrapers, etc., hastens the final funeral of the frenzied fanatics.

A Bullgrader digs a burial place for dead Japanese

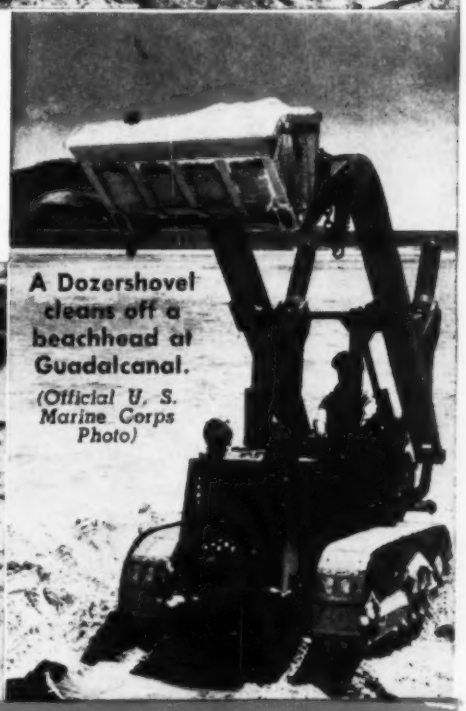
On every front, too, Bucyrus-Erie tractor equipment like the Bullgrader above is in the thick of it. Outstanding as always, now it is helping prepare the Axis burial.

N-71C

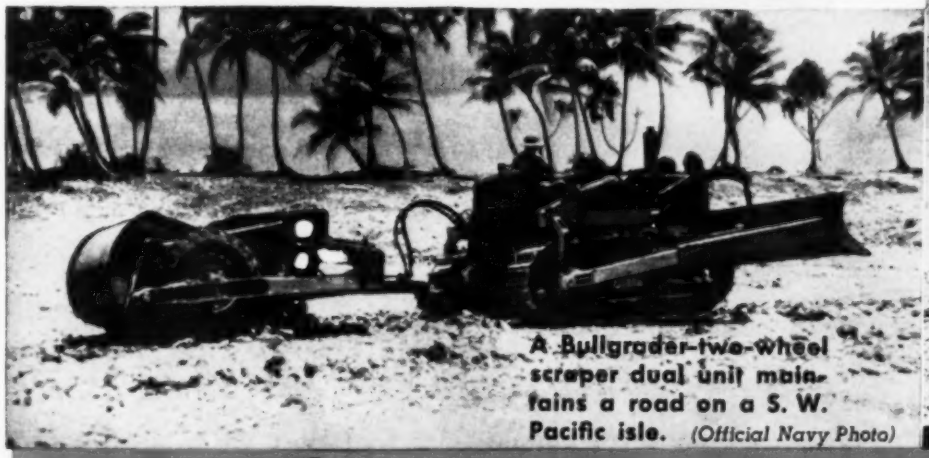
A Bullgrader begins preparing a road at Tarawa. *(Official U. S. Marine Corps Photo)*

Most of our production must still go to our armed forces; a limited number of machines is, however, now available for high priority civilian operations. Be sure to see your International TracTracTor Distributor for information on new machines, rentals, and service.

BUCYRUS-ERIE CO., SOUTH MILWAUKEE, WISCONSIN



A Dozershovel cleans off a beachhead at Guadalcanal. *(Official U. S. Marine Corps Photo)*



A Bullgrader-two-wheel scraper dual unit maintains a road on a S. W. Pacific isle. *(Official Navy Photo)*

BUCYRUS ERIE TRACTOR EQUIPMENT

SEE YOUR
INTERNATIONAL TRACTRACTOR
DISTRIBUTOR

This Metal Blade in your SKILSAW cuts all masonry products Faster, Cleaner, *Without Dust!*

Embedded diamond grit gives this SKILSAW metal blade a faster-working, longer-lasting edge for smoother, cleaner cutting of all masonry products, hardened asbestos cement, glass, and a host of other building materials.

Outlasts abrasive discs 5 to 1 . . . there's only ⅛-inch loss of radius during the entire life of the blade. *Saves time* . . . eliminates need of frequent adjustment of saw base (a real time killer, as any user of abrasive discs knows.) *It's safer* . . shatter-proof, no danger of flying pieces of abrasive. *It's dustless* . . . a practical, easy-to-install water attachment supplies water to point of cut, eliminates dust. This blade cannot be used dry.

Available in thin, medium or heavy types in 7, 8, 9 and 10-inch sizes to fit SKILSAW Models "77", "825", "87" and "127". Ask your distributor today to demonstrate the *greater cutting speed, safety* and *economy* of the SKILSAW Diamond Edge Blade!

SKILSAW, INC.
5033-43 Elston Ave., Chicago 30, Ill.
Sales and Service Branches in All Principal Cities

Billions of square feet

OF AMERICAN WELDED WIRE FABRIC

used in past decade to reinforce concrete

IN concrete floors, roofs and walls—airport runways and aprons—roads, sidewalks and pipes, American Welded Wire Fabric provides a backbone of steel that weaves strength into the concrete slab in every direction.

Where wire fabric is used, construction time is cut, costs are reduced and a permanently safe, long-lasting structure is assured. This product is convenient to handle, is installed quickly—always stays in place. Architects, engineers and contractors have found high-yield-point, cold-drawn welded wire fabric the ideal material for concrete reinforcement, as evidenced by the billions of square feet used during the past ten years.

AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York

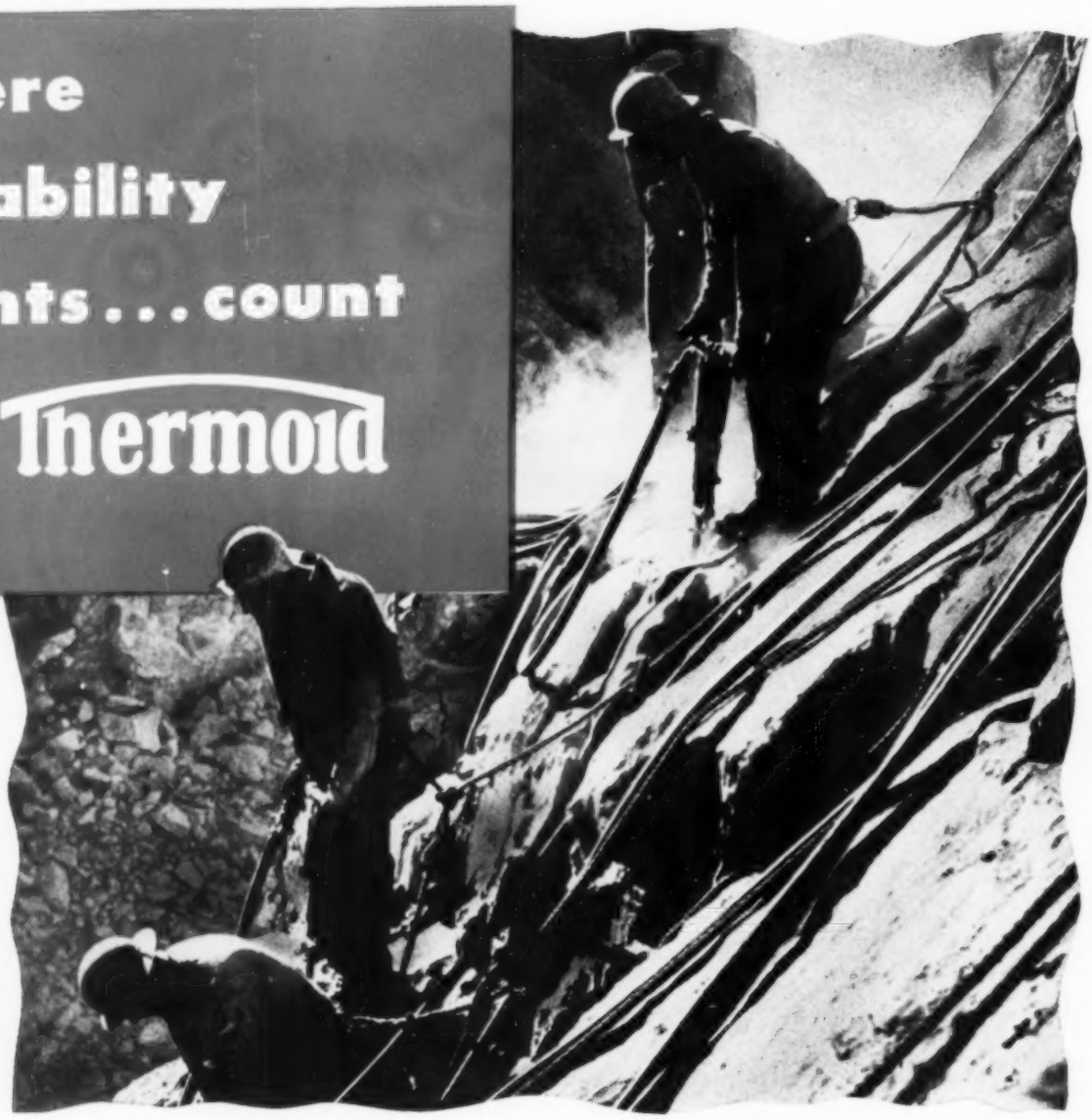
Columbia Steel Company, San Francisco, *Pacific Coast Distributors*

United States Steel Export Company, New York

AMERICAN WELDED WIRE FABRIC

UNITED STATES STEEL

where reliability counts . . . count on Thermoid



Among contractors in many fields, you frequently hear the phrase, "You can rely on Thermoid". This reputation has been earned by years of trouble-free service. This quality of reliability makes Thermoid not only the choice for all ordinary projects, but the choice for those really tough construction jobs that call for rugged, dependable equipment.

Thermoid Hose (air, water, suction, steam), Thermoid Conveyor Belting, Industrial Brake Linings and other Thermoid Products are designed by engineers with a thorough knowledge of your *on the job* requirements. Thermoid Products have built-in reliability and extra performance. It's Good Business to do Business with Thermoid.

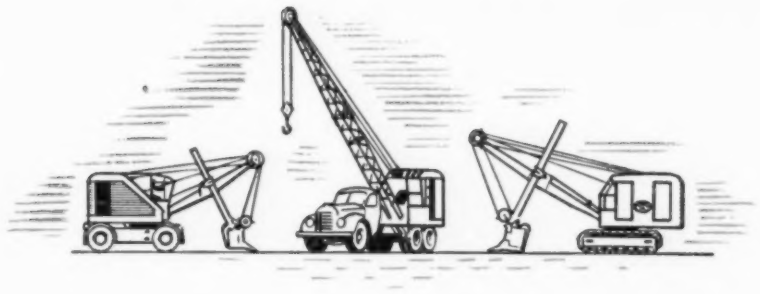
Don't put it off 'til tomorrow . . . Buy **MORE WAR BONDS TODAY!**

THE THERMOID LINE INCLUDES: Transmission Belting • F.H.P. and Multiple V-Belts and Drives • Conveyor Belting • Elevator Belting • Wrapped and Molded Hose • Sheet Packings • Industrial Brake Linings and Friction Products • Molded Hard Rubber and Plastic Products.

Thermoid Rubber

DIVISION OF THERMOID COMPANY

TRENTON, NEW JERSEY



Announcement of interest to:

CONTRACTORS, ENGINEERS, AND USERS OF MATERIAL HANDLING EQUIPMENT

During the past three years, while new Byers shovels and cranes have not been available to commercial users, our entire company has been devoting its efforts to: (1) meeting enlarged production schedules for machines for our armed forces; (2) maintaining prompt parts service to owners, and (3) following our long established policy of continual improvement of our products.

When shipment of Byers excavators to private owners again becomes possible, our many customers and friends in the construction industry will find that new and revised models of Byers shovels and cranes have been greatly improved in design and construction. This has been accomplished with the aim of providing better values for owners and greater convenience for operators. When this time arrives, the news will be announced to the entire construction industry.

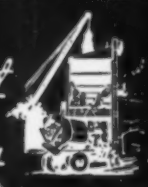
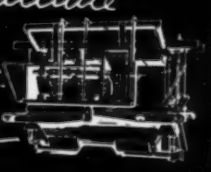
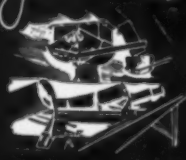
Another policy of prime importance to shovel and crane users is Byers method of distribution through reliable, established construction equipment dealers. This policy will be continued in the firm belief that no other system provides users with equal service, satisfaction, and guarantee of fair dealing during the life of the equipment. You will find these dependable representatives to be of the highest type of construction machinery distributor in your territory.

THE BYERS MACHINE CO.

★ Ravenna, Ohio ★

Distributors throughout the World

WHAT'S ON *Your* SLATE *for the* IMMEDIATE FUTURE *or the* POST-WAR YEARS ?

How about  *Ready Mixed Concrete Plants — engineered for even greater capacities? Or Central Mixing Plants* *.. that are pretty nearly "push-button" in control? Or Batching Plants ?..* *Or Bulk Cement Plants?* *Or high production Sand and Gravel* *Plants? Or cleverly engineered* *Concrete Products Plants? Or do you need Storage Bins* *or .... Coal Bins?....* *.. Or are you looking for modern materials handling equipment such as the ingenious and startling Butler Carscoop* *that darts in and out of box-cars and corners at a phenomenal saving in time and labor?..* *Or large capacity Cement Transports ...* *Or Portable Concrete Hoppers to facilitate handling on the job?*  *or Weigh Batchers Or Bin Gates..*  *?. Whatever it is Butler has it — and if you'll write for Bulletin 260 - you'll have complete information!*

BUTLER BIN CO. WAUKESHA, WIS.

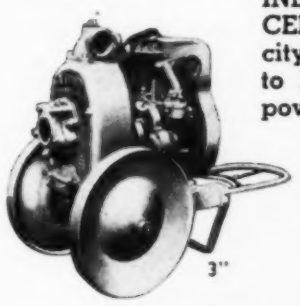
LOOK AHEAD WHEN YOU BUY

Guaranteed performance is *minimum* performance for JAEGER "Sure Prime" PUMPS

3000 Gallon "Bantam"

Contractors who watch their costs know there's a *big* difference between a Jaeger "Sure Prime" and an ordinary pump of the same size and rating. Jaeger Pumps are built to exceed their promises — deliver their rated capacity under tougher conditions, prime unfailingly and up to 5 times faster, assure you of thousands of *extra* hours of dependable cost-cutting service during the post-war building years ahead.

INDIVIDUALLY TESTED AND CERTIFIED for vacuum, capacity and pressure. Sizes 1½" to 10"; gas, electric or diesel power.



3"

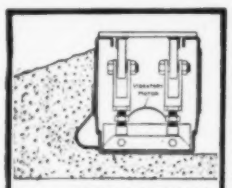
10"

JAEGER DISTRIBUTORS in over 100 cities sell, rent and service "Sure Prime" Pumps.

LOOK AHEAD WHEN YOU PLAN

Jaeger's method of VIBRATION ON THE FINISHER will meet tomorrow's specifications . . .

Either Vibratory Tube or "Bullnose" Vibratory Screed



Gives DEEP INTERNAL Vibration of the Mass

"Bullnose" front screed, equipped with vibratory motors, crowds material under, insures deep internal vibration of entire mass and maximum density of slab from form to form — the original and unfailingly successful Jaeger method. Compare this with mere surface vibration which, tests show, does not efficiently overcome porosity at base and sides.

Although Jaeger can furnish a vibratory attachment for use on Concrete Spreaders if desired, the recommended Jaeger method of *vibration on the Finisher* has proved superior for any true vibratory mix. On an efficiently run job, only the Finisher has time to go back for more than one vibratory pass, as often needed. Also, it is the machine which always finishes to form level, thus insuring an over-all vibrated surface. (No low spots to be filled with unvibrated material or high spots from which the vibrated surface may be torn as is possible when vibration is on the Spreader.)

To meet future specifications we recommend the Jaeger Vibratory Finisher with "bullnose" screed giving DEEP INTERNAL VIBRATION and maximum density from form to form, or, where conditions are suitable, the use of a Vibratory Tube *on the Finisher*.

THE JAEGER MACHINE COMPANY

800 Dublin Avenue, Columbus 16, Ohio

JAEGER *Engineered* **EQUIPMENT**

"FLEET-FOOT" CRANE-LOADERS

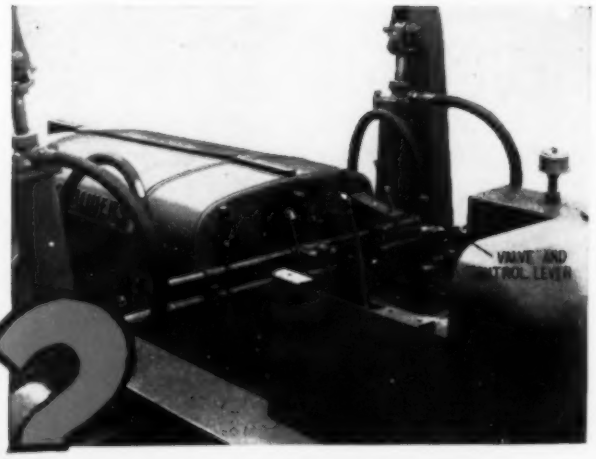
"SPEEDLINE" MIXERS

"SURE-PRIME" PUMPS

"AIR-PLUS" COMPRESSORS

JAEGER-LAKEWOOD SPREADERS, FINISHERS AND BITUMINOUS PAVERS, FORMS, FORM TAMPERS—"DUAL-MIX" TRUCK MIXERS, AGITATORS—JAEGER HOISTING ENGINES, TOWERS

Ever Operate a BAKER?

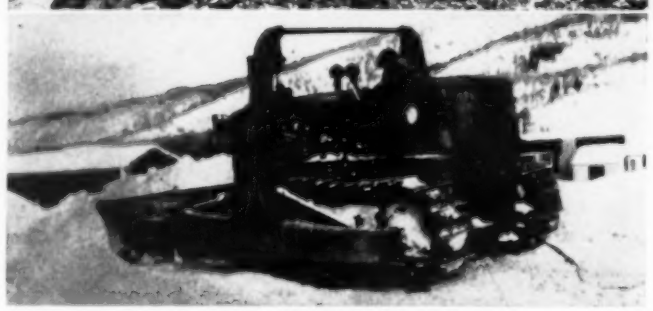


If you did, we need not tell you how simple it is. We've been talking about direct hydraulic lift and full down pressure on the blade and about the ease and low cost of maintaining Baker bulldozers and gradebuilders. But, as a contractor who operates five Bakers pointed out to George Phares, our No. 1 field man—"Baker's ease of control is something to write home about."

Operator faces forward—no need to sit askew. Control lever is within convenient reach. Four lever positions—*float, down, hold, raise*. Fast, positive action. That *hold* is important—you can put the blade in a cut and hold it there! On many occasions, especially where the going is tough, hydraulic down pressure is the operator's "ace in the hole."

Baker Bulldozers on Allis-Chalmers 2-cycle diesel tractors are making it easier for our fighting forces on every front.

THE BAKER MFG. CO.
568 Stanford Ave., Springfield, Ill.
"If it concerns Victory, it concerns us"



Top: Baker Bulldozer on Allis-Chalmers tractor clears floor of pit for buried fuel tank in South Pacific.
Bottom: Private Wally Saner, former Baker employee, removing snow at Alaska air base with Baker Gradebuilder which helped build base.

BULLDOZERS SNOW PLOWS **BAKER** CONSTRUCTION EQUIPMENT

Trained tire men ready to help truck owners through rubber crisis

B. F. Goodrich conservation program gets extra miles out of tires.

HERE'S help in keeping your trucks running. Despite the growing shortage of truck tires, you can keep more trucks on the road by increasing tire mileage through scientific maintenance.

B. F. Goodrich offers you the services of trained tire men. They will take over complete supervision of tire maintenance, assure you of the greatest possible service from every casing. Under this program a B. F. Goodrich tire consultant makes a thorough study of your operation. Among the many things he checks are loading docks, garages and parking areas, for conditions which affect tire life; the vehicles themselves to determine causes of unusual tire wear conditions resulting from mechanical irregularities such as wheel or axle misalignment, improper caster or camber, defective brakes and springs; sizes of loads and load distribution; routes traveled; air compressors, accuracy of air gauges and use of valve caps; matching of duals; the tire record system used, and dozens of other details, all of which affect tire wear.

Regular inspections made

The B. F. Goodrich man makes complete and detailed recommendations. He advises as to when and how tires should be scrapped, repaired or recapped. He checks the operation regularly, works closely with your maintenance men, helps them constantly.

The result is increased tire mileage, a reduction in road delays, improved efficiency, lower maintenance costs and longer equipment life.

Hundreds now saving

So successful has this plan been that many of the country's largest fleets now use the service. Hundreds of truck owners are today saving rubber and money under this program. For example:

A large fleet owner saved an estimated 466,000 tire miles through tires recovered from the scrap pile alone.

A hauler reduced road delays to one in 1,356,000 miles.

Mileage of rear tires in a small fleet was increased 15% through correction of irregular wear.

In another fleet tire inflation records showed an increase from 25.6% properly inflated to 98%, resulting in greatly increased mileage.

These are typical of the specific savings and improvements reported by truck owners wherever this plan is used. In every fleet greater tire mileage and efficiency is assured through the proper application of scientific maintenance methods.

Cost is low

The cost of the B. F. Goodrich conservation service is low. Rubber savings begin immediately. If you act quickly, you can get the benefits of this proven program which has been in operation for more than two years. A limited number of trained men are still available to take over additional fleets. For full information wire or phone The B. F. Goodrich Co., at the address below, or send in the coupon.

A few typical users

Here are a few of the fleets now operating under the B. F. Goodrich Tire Conservation Program. Add your name to this list and protect your trucking operation:

Edward Hines Lumber Co., Hines, Ore.
Howat Concrete Company, Washington, D. C.
State of Michigan Highway Dept.
Lawrence Lumber Company, Alexandria, Va.
The Clifton Coal and Supply Co., Lakewood, Ohio
Coca-Cola Bottling Co. of Rhode Island
General Baking Co., New York City
Super Concrete Corporation, Washington, D. C.

Other names on request. More than 300 companies are now using this service.

In war or peace

B.F.Goodrich

FIRST IN RUBBER

Tire Conservation Dept., Room 115
The B. F. Goodrich Co., Akron, Ohio

Please give me full information on your fleet tire conservation program.

Company _____

Address _____

_____

Attention of: _____

Number of Running Wheels _____

BACK OF EVERY ATTACK . . .

Preformed wire rope

GIVES BOMBER PILOTS SPLIT-SECOND CONTROL

A pilot flies his bomber through black bursts of flak toward an enemy target. Suddenly the bombardier's voice comes through the intercom, *"On target!"* Then, *"Bombs away!"*

From take-off to target, the bomber's engines, rudders, bomb releases are controlled to split seconds by Preformed wire rope. Thousands of feet of it go into the rigging of a bomber.

Every foot of it on all our fighting planes is Preformed—because only this superior wire rope gives the long life, the never-failing action airplane controls must have.

Preformed is proving in the sky—as it has proved on sea and land—that it is the tough wire rope for the tough war jobs. Back of every attack, Preformed is in there fighting.

ASK YOUR OWN WIRE ROPE MANUFACTURER OR SUPPLIER FOR PREFORMED WIRE ROPE

There's been a big change

★ Football is still a matter of touchdowns—but time has developed a more skillful game with many technical improvements.

The duties of a tapered roller bearing are the same, too. Tyson, however, has introduced the *All-Rolls* design which has vastly increased its efficiency.

With the addition of *thirty percent more rolls*, Tyson has almost doubled ordinary roller bearing life. Size for size, the Tyson "All-Rolls" bearing has greater load capacity—more strength and rigidity. It's a heavy-duty bearing for heavy-duty jobs.

The big name in bearings today is . . . **TYSON!**

TYSON BEARING CORPORATION · MASSILLON, OHIO

COUNT THE ROLLS · THE ROLLS COUNT

Tyson

TODAY'S HEAVY-DUTY BEARING

★ KEEP ON BUYING WAR BONDS ★

Speed was needed...

LEHIGH EARLY STRENGTH supplied it

Flight Hangar, Buffalo Airport, Cheektowaga, N. Y. Contractor: Poirier & McLane Corporation.

• With cold weather around the corner, this giant hangar had to be completed in 120 days. That's why the contractor used Lehigh Early Strength Cement in the trusses. It provided the quick curing required to avoid sudden freezing, and the quick strength needed for prompt removal and re-use of forms. Also it eliminated the necessity for heat protection.

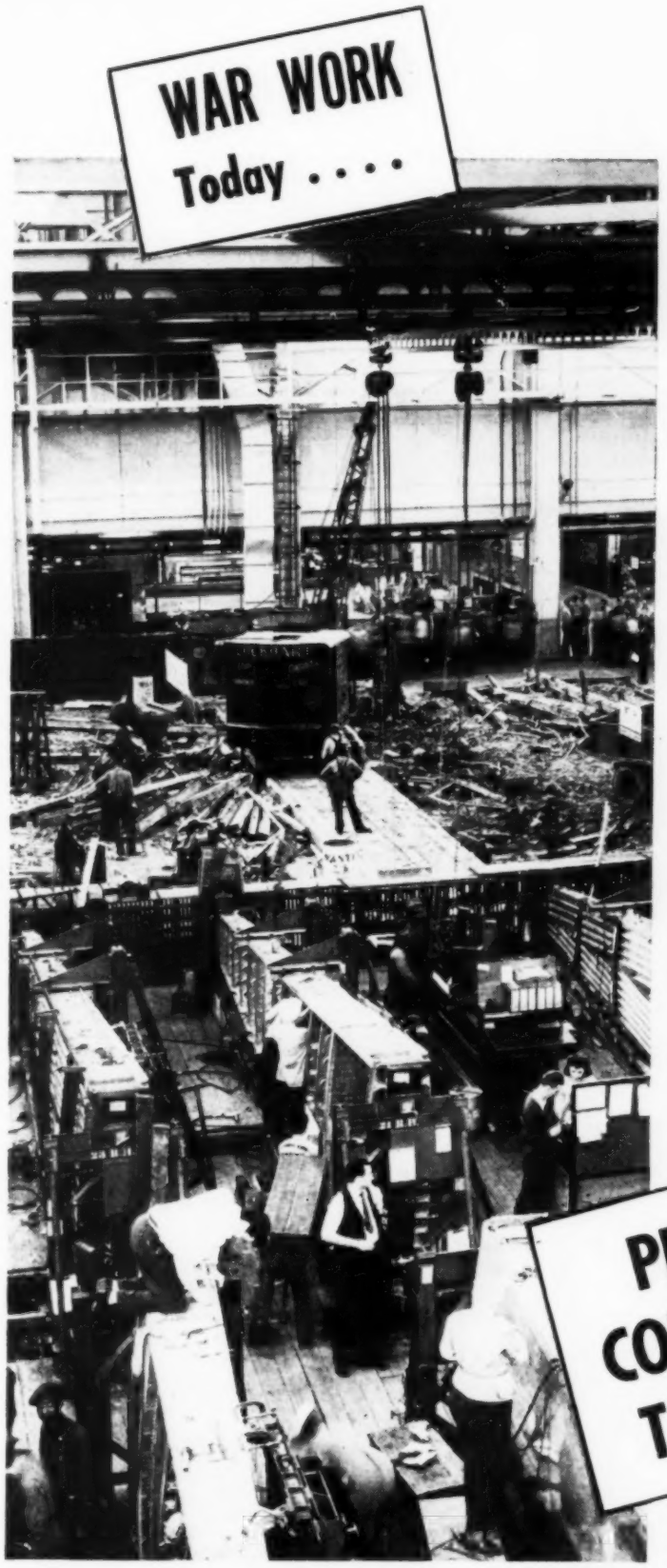
Lehigh Early Strength Cement makes a finer, denser concrete. And it takes only one or two days to equal the strength that normal cement acquires in seven days—an important fact to keep in mind when planning your construction work for the cold winter months that lie ahead.

The Lehigh Service Department will gladly furnish particulars.

Lehigh CEMENT

Use LEHIGH EARLY STRENGTH CEMENT *for* service strength in a hurry

LEHIGH PORTLAND CEMENT COMPANY • ALLENTOWN, PA. • CHICAGO, ILL. • SPOKANE, WASH.



When Lockhart Contracting Co. of Akron moved this BAY CITY into the Goodyear Aircraft plant to remodel under a "conversion" program they depended on reliable machine performance to get the job done on time. This was just as definitely war work as if they were building an Army camp or an air base in the South Pacific. Tomorrow, work of this nature will be called "Peace-time" construction, but it will require the same efficient operation so as to make money on excavating and material handling. If you are not familiar with the rugged, simplified design, the ease of operation and the low cost maintenance which has always been associated with BAY CITY equipment, why not ask for catalogs so we can get acquainted. Right now, all production is going to the Armed Services, which means your old equipment must be checked more frequently to insure keeping it in good operating condition. There will be no new machines until after V-Day, but you can, however, learn more about BAY CITY by writing Bay City Shovels, Inc., Bay City, Michigan.

PEACE TIME CONSTRUCTION TOMORROW!

BAY CITY SHOVELS
12 Sizes
⅜ to 1½ Yard
Also truck mounted shovels and cranes

BAY CITY

SHOVELS • CRANES • DRAGLINES • TRENCH-HOES • SKIMMERS

Bethlehem Steel

for

POST-WAR HIGHWAYS

It's going to be a huge post-war job, building the new highways needed by a growing America, carrying out hundreds of construction projects that had to lie fallow during the wartime years.

When the job begins, Bethlehem's complete line of highway products will again be at the service of road builders. Bethlehem road steels, backed by years of experience, have proved themselves—they're engineered all along the line for sturdy performance.

Plan to handle your post-war highway contracts by specifying this reliable source of supply for *all* road-steel products. Contractors can save time, bookkeeping and letter-writing by placing one order for all their needs for a given highway job with a conveniently-located Bethlehem warehouse. For full information about Bethlehem Road Steel Service, get in touch with the nearest district office, or write direct to Bethlehem Steel Company, Bethlehem, Pa.

REINFORCING STEEL

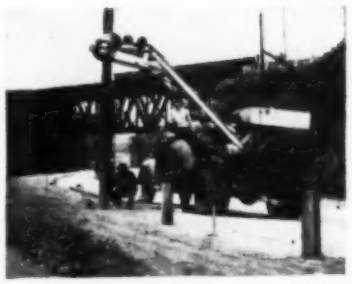
Bethlehem *Reinforcing Bars,* plain and deformed, are made of new billet steel in standard sizes and grades, and can be bent to shape and cut to size in most Bethlehem warehouses. *Bar Mats,* made of deformed bars clipped together, are easy and convenient to install, and lie flat. *Welded Wire Fabric* is fabricated from tough, cold-drawn wire to meet all standard highway specifications.

HIGHWAY GUARD

Bethlehem's beam-type guard rail, called the *Safety-Beam,* is made in standard 12 ft., 6 in. lengths, or if preferred, can be supplied in lengths up to 50 ft. *Cable Guard Rail* is durable three-strand steel cable, with a double-galvanized coating. *Highway-Guard Bracket,* made of high-tensile spring steel, is attached with one bolt to steel or wood posts, and supports three or four cables.

STEEL POSTS

Bethlehem *Steel Highway Guard Posts* are readily driven and have superior resistance to impact and side thrust. Bethlehem Steel *Highway Sign Posts* are wide-flange channel sections, punched with holes and pointed for easy driving.



STEEL PILING

Bethlehem *Steel Sheet Piling* for temporary or permanent retaining structures. *Steel H-Bearing Piles* for bridges, over- and under-pass, and other load-bearing structures.

BETHLEHEM STEEL

OTHER BETHLEHEM PRODUCTS FOR HIGHWAYS

ROAD JOINTS — DOWELS — DOWEL BAR SUPPORTS
ROAD STRIP — WIRE ROPE AND STRAND — BAR TIES
GUARD RAILS — ANCHOR RODS — RIGHT-OF-WAY FENCE AND POSTS
PIPE — HOLLOW DRILL STEEL — DIGGING BARS
STRUCTURAL STEEL — STEEL CRIBBING MOLD BOARDS
REINFORCING FOR CONCRETE — BRIDGE FLOOR REINFORCING
CORRUGATED SHEETS — CONCRETE SLAB SPACERS
TURNBUCKLES — TIE RODS, SPIKES, BOLTS AND NUTS
TIMBER BRIDGE HARDWARE

U. S. Signal Corps Photo

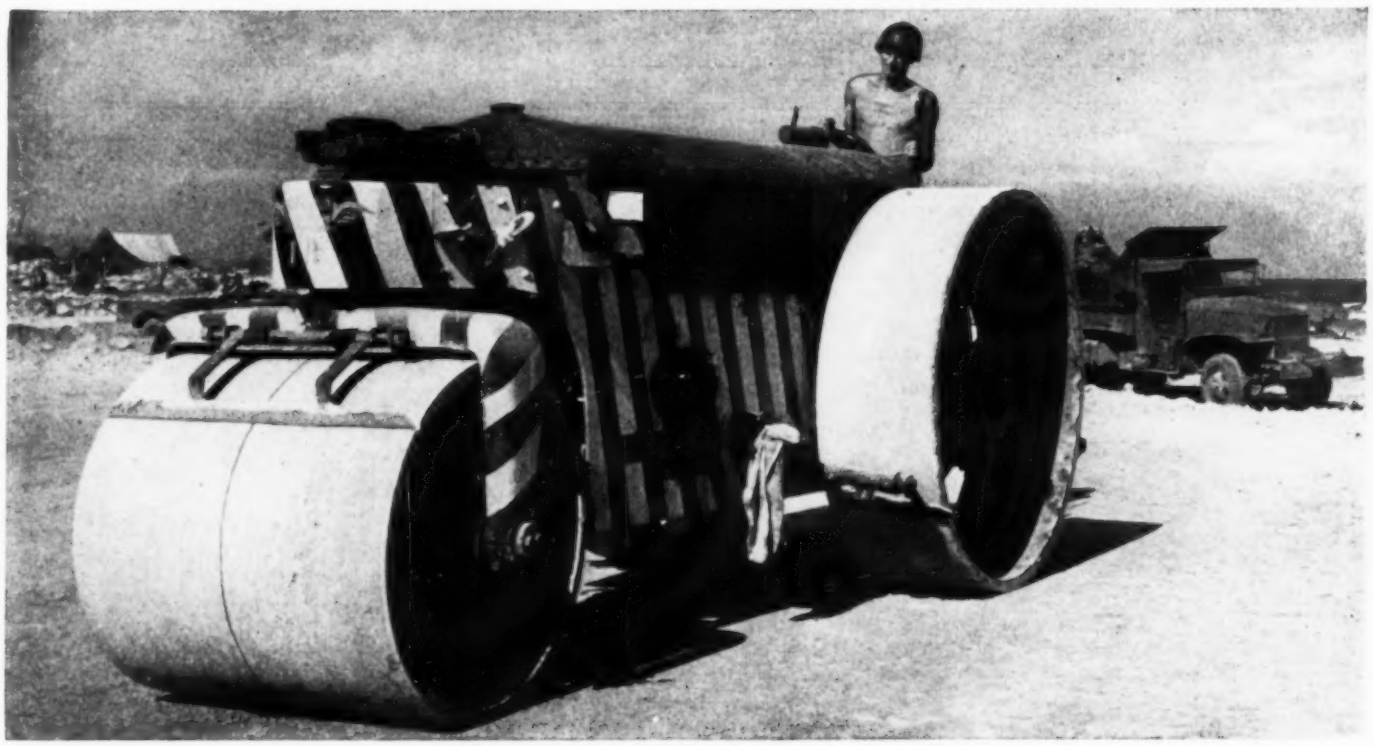
A GALION MOTOR GRADER—A GALION ROLLER

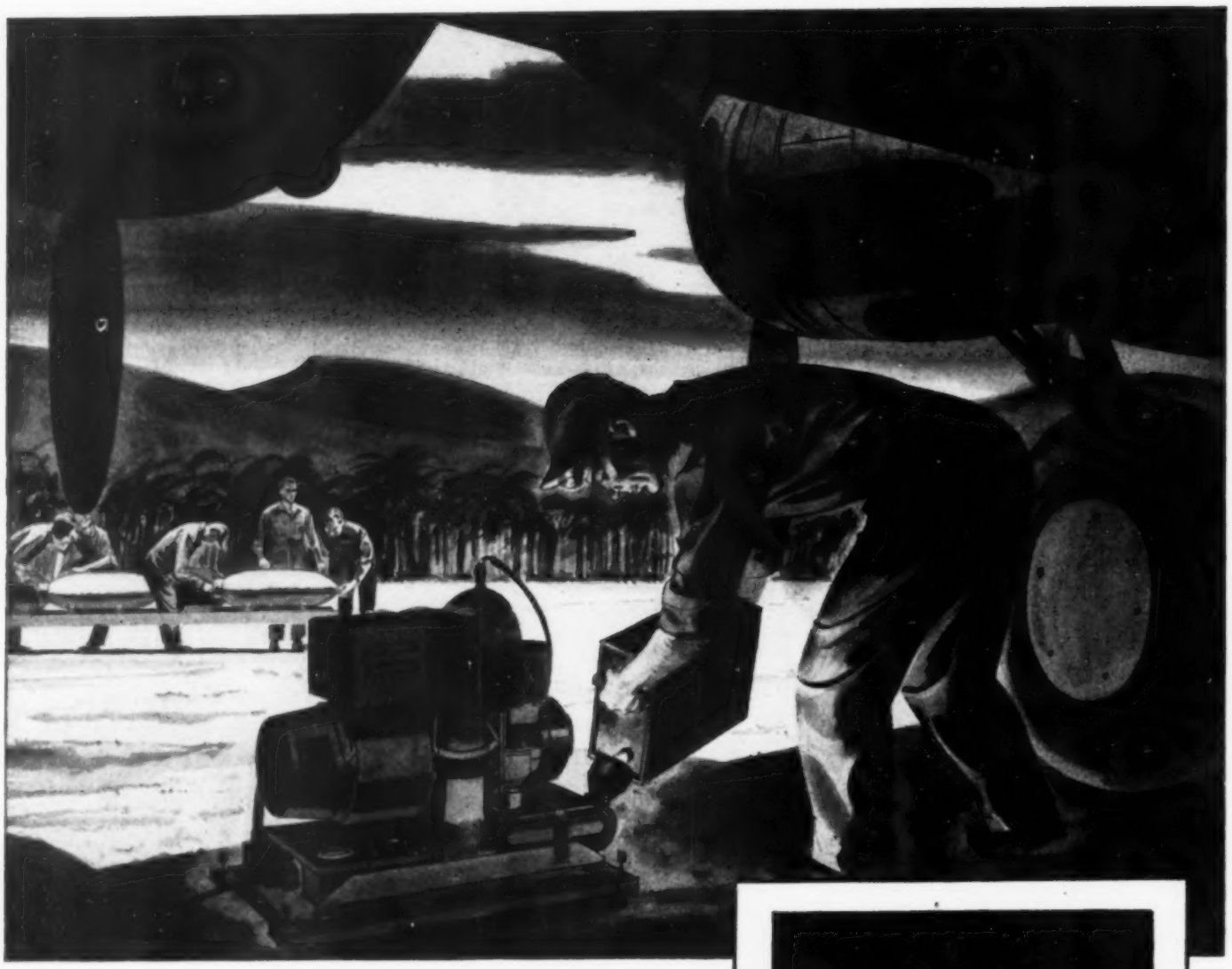
Assignment—somewhere overseas with our armed forces where the going is really tough. Attainment—providing top performance in road building and airport construction, and otherwise contributing to the all-out effort. You'll find Galions on all the fighting fronts.

THE GALION IRON WORKS & MFG. CO.

MAIN OFFICE AND WORKS: GALION, OHIO

U. S. Navy Photo





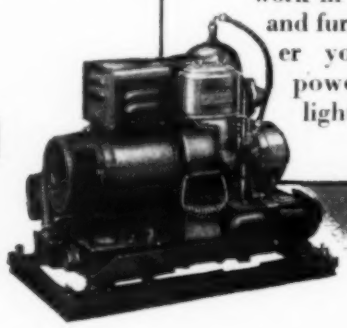
It eats the same grub as planes

And likes it! . . . Yes, a Homelite Portable Generator can be operated on high octane, highly leaded aviation gasoline. No special diet is necessary . . . even 100 octane gas, the fuel of planes, can't harm a Homelite's built-in gasoline engine.

The simple reason is this . . . the Homelite *two-cycle* engine has no exhaust valves to burn out. That's right . . . no valves to foul with lead or carbon . . . no valve seats to reface. Its only valve is a simple rotary valve that governs the flow of fuel.

This, plus automatic voltage regulation, a lubrication system that supplies fresh, clean oil at each revolution, are some of the many reasons why thousands of rugged Homelite Portable Gasoline-engine-driven Generators are working in and around our military planes everywhere.

A Homelite Portable Generator isn't too fussy how you treat it or how you use it. Just give it some gasoline with a proper mixture of oil and it will work all day and night. It will work in rain, snow, sleet or heat and furnish all the electric power you need for operating powerful, flickerless floodlights or handy electric tools.



HOMELITE CORPORATION

PORT CHESTER, NEW YORK

7 YEARS WITHOUT A BREAKDOWN OR MACHINE REPAIR

Behind this letter is the all-out performance of a General Excavator which has been in all-around municipal service since 1937 . . . . with the first repair part yet to be purchased! Here is strong basis for including GENERAL-built equipment in YOUR postwar plans.

GENERAL

Mr. George W. Brown,
Town Superintendent,
Walworth, New York.

Dear Mr. Brown:

Just a few lines to thank you for writing.

It is gratifying to note that you have yet to buy your first actual repair parts for your General Excavator, particularly since this machine was shipped more than 7 years ago. Most folks would expect that a machine of that age, and with the service it has given, would be pretty well worn out — or would have required thousands of dollars in repair expenditures.

In all modesty, Mr. Brown, we do take pride in the way Generals can "dish it out" and "take it," and here's hoping you continue to have the best of luck with your machine. Here too, incidentally, is our promise that after the war, Generals will be better than ever!

Cordially,

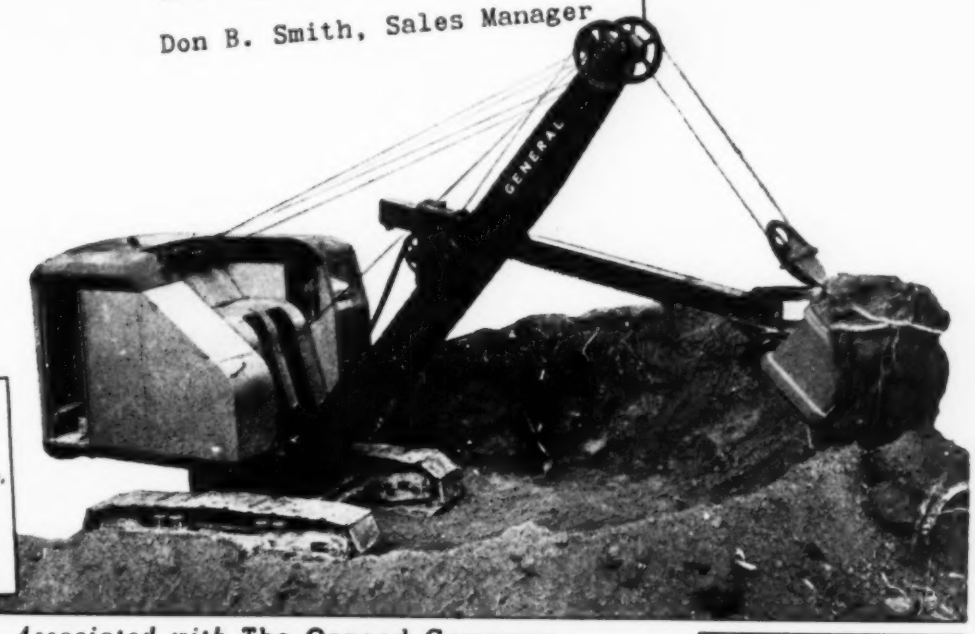
THE GENERAL EXCAVATOR COMPANY,

Don B. Smith, Sales Manager

DBS/fb

GEORGE W. BROWN
Town Superintendent
Walworth, N. Y.

. . . "during national emergency I've personally operated and cared for this General Excavator . . ." surprised to find so rugged a machine so easy to handle and keep adjusted . . . in addition to loading bank-run gravel, we use it on tough highway widening jobs — uprooting trees, breaking hard-pan rock . . . yet to encounter job too tough for The General."



AND WATCH
The General "Type 10"
the revolutionary Machine of Tomorrow, when the swing is to postwar business. Crane-shovel-dragline all in one, this advanced design rubber-tired, one-man, one-engine rig will give you a new lease on profit opportunities in your territory. Write for details today!

THE OSGOOD COMPANY
SHOVELS, DRAGLINES
CRANES
CRAWLER & WHEEL MOUNTS
DIESEL, OIL, GAS, ELECTRIC

Associated with The Osgood Company

GENERAL EXCAVATOR CO.
CRANES-SHOVELS MARION OHIO U.S.A. GENERAL OSGOOD
MARION, OHIO

GENERAL
CRANES, DRAGLINES
AND SHOVELS
DIESEL, GAS, ELECTRIC

GAR WOOD
ROAD MACHINERY

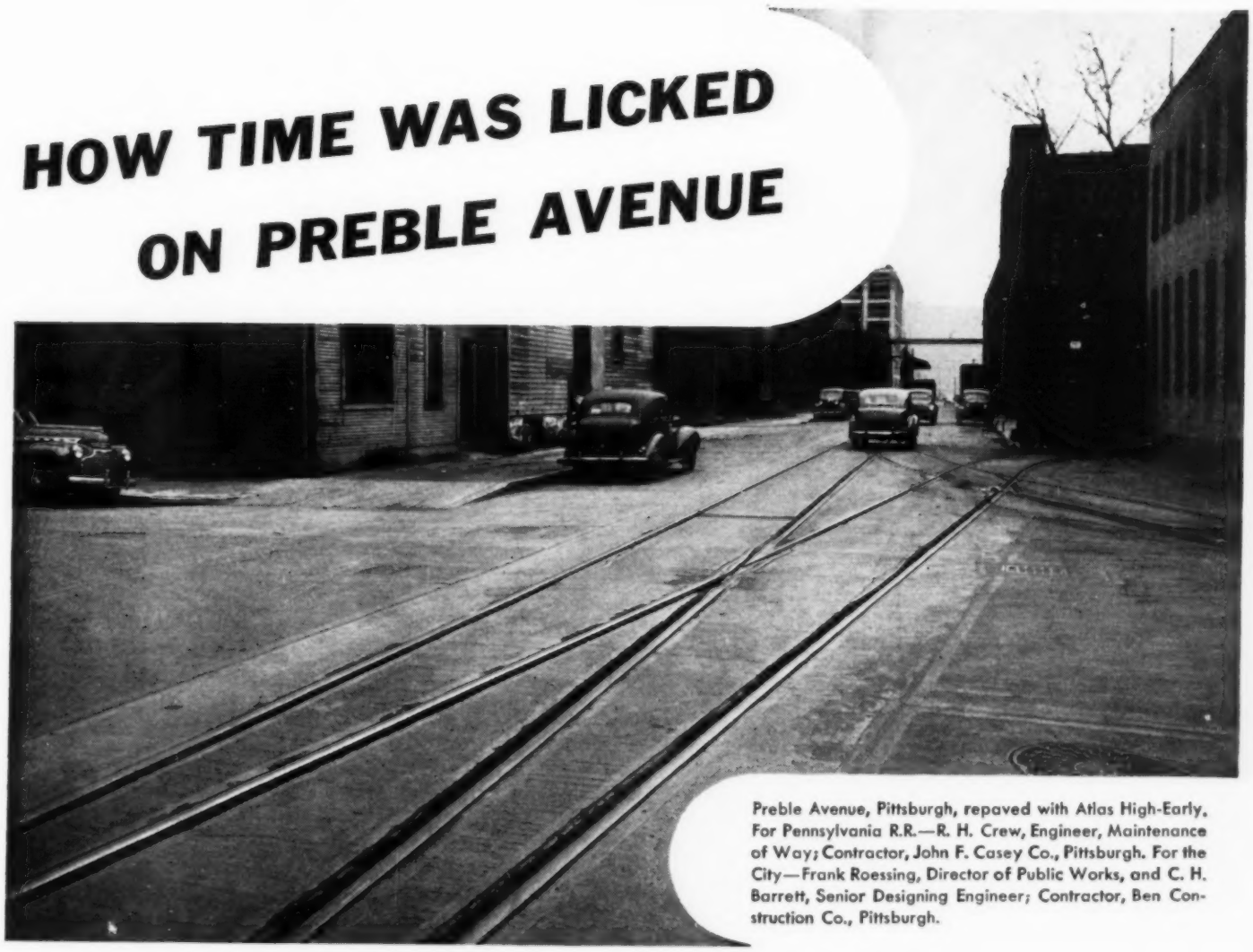
Make your blueprinted plans NOW for postwar earthmoving . . . make sure Gar Wood 2 and 4 Wheel Hydraulic Scrapers, 4 Wheel Cable Scrapers, Hydraulic and Cable Dozers and Trailbuilders, Hydraulic and Cable Rippers and Tamping Rollers are included in your Equipment Plans. This is double assurance that your planning is up to the minute.

Look to Gar Wood and BE READY

GW ROAD MACHINERY
Is Sold Through
ALLIS-CHALMERS
Dealers Everywhere

ROAD MACHINERY DIVISION
GAR WOOD INDUSTRIES, Inc.
DETROIT 11, MICHIGAN

HOW TIME WAS LICKED ON PREBLE AVENUE



Preble Avenue, Pittsburgh, repaved with Atlas High-Early. For Pennsylvania R.R.—R. H. Crew, Engineer, Maintenance of Way; Contractor, John F. Casey Co., Pittsburgh. For the City—Frank Roessing, Director of Public Works, and C. H. Barrett, Senior Designing Engineer; Contractor, Ben Construction Co., Pittsburgh.

Pittsburgh paving job in use 5 days earlier, thanks to Atlas High-Early

THE fall of 1943. This busy street, serving eleven important industries by rail and truck, had to be repaved. The job was *rush*, for time lost meant lost deliveries.

That's why Atlas High-Early was used. *Forty-eight hours* after each of the nine different sections of concrete was placed, it was opened to traffic. Five days earlier than if normal cement had been used! Five days saved on wartime shipments and deliveries!

• • •

Write for a copy of "Case Histories of Days and Dollars"—experience records of other jobs where Atlas High-Early has helped contractors beat normal schedules and has saved time, money, manpower and equipment. Address Universal Atlas Cement Company (United States Steel Corporation Subsidiary), Chrysler Building, New York 17, N. Y.

OFFICES: *New York, Chicago, Albany, Boston, Philadelphia, Pittsburgh, Minneapolis, Duluth, Cleveland, St. Louis, Kansas City, Des Moines, Birmingham, Waco.*

CHECK ON ATLAS HIGH-EARLY for Wartime Construction

Because Atlas High-Farly cement gains strength rapidly and produces serviceable concrete in one-third the usual time or less on some jobs, it—

1. ***Permits earlier use*** of concrete, and thus gives owner earlier occupancy.
2. ***Saves manpower*** when such conservation is needed most — releases men for new jobs more quickly.
3. ***Conserves lumber.*** Forms may be stripped sooner—sometimes in 24 hours instead of from 3 to 5 days—and re-used. Hence fewer sets of forms may be needed, saving time, labor and lumber.
4. ***Reduces overhead*** by saving time, manpower and equipment.

CM-H-66

SAVE TIME IN WARTIME WITH

Atlas High-Early Cement

A UNIVERSAL ATLAS PRODUCT

What makes these Upson-Walton Shackles Better Shackles?

THERE are two ways to make shackles. One way is to set up shop and make them. The other way—the Upson-Walton way—is to engineer them as carefully and as thoughtfully on the drawing board as if they were airplane engines—long before they go to shop.

Check these Upson-Walton shackle specifications. They are some indication of how we are able to produce shackles that give *maximum satisfaction in actual use.* Better shackles—and better buys!

Steel Specifications: Upson-Walton specifies only specially selected, fine grain, higher tensile steels. These steels have superior forging qualities—give a more uniform product capable of developing more strength.

All Shackles are made to rigid United States government specifications on spreads and clearances.

Made in Solid Dies: All shackles in sizes up to and including 1⅛ inches are drop forged on solid dies. This process requires more expensive tooling, but the additional cost is absorbed in volume production. Upson-Walton shackles cost no more, but they are all uniformly better shackles.

Control Inspection: All Upson-Walton shackles are inspected 3 separate times before shipping. First, as they come from trimming; second, before and after drilling and tapping; and third, final inspection before shipping.

Galvanized Threading: All galvanized screw pin shackles have galvanized pins and galvanized threads. Galvanizing is done after threading, so it is not cut off on Upson-Walton shackles.

Uniform Threads: All thread tolerances are closely held—tight and firm, yet easy to engage.

AS WE GO TO PRESS, DELIVERIES ON UPSON-WALTON SHACKLES ARE GOOD

THE UPSON-WALTON COMPANY

Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks

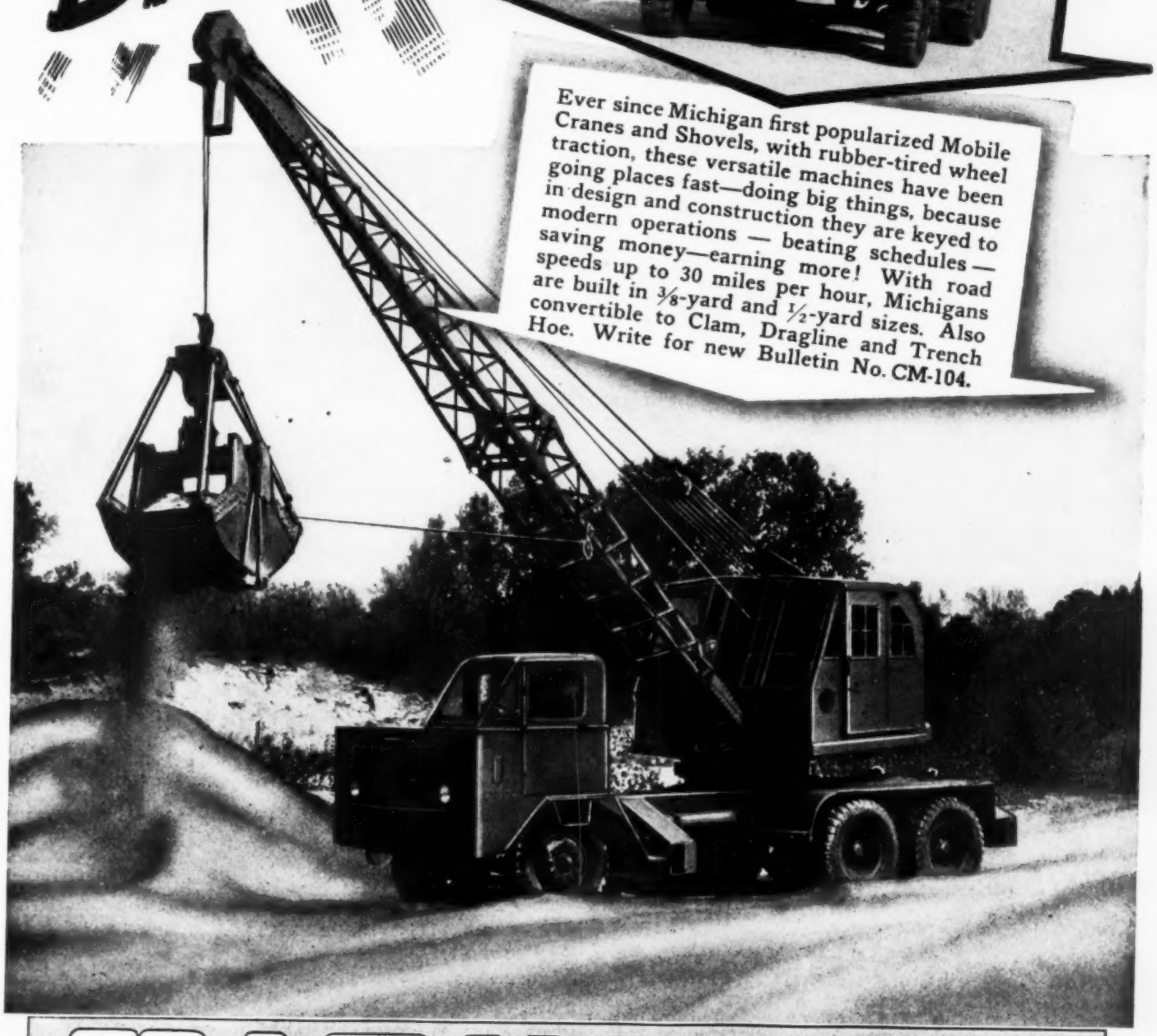
NEW YORK • PITTSBURGH • CLEVELAND • BUFFALO • CHICAGO

U-W

Established 1871

Going Places to do BIG things

Ever since Michigan first popularized Mobile Cranes and Shovels, with rubber-tired wheel traction, these versatile machines have been going places fast—doing big things, because in design and construction they are keyed to modern operations — beating schedules — saving money—earning more! With road speeds up to 30 miles per hour, Michigans are built in 3/8-yard and 1/2-yard sizes. Also convertible to Clam, Dragline and Trench Hoe. Write for new Bulletin No. CM-104.



MICHIGAN

POWER SHOVEL COMPANY

BENTON HARBOR, MICHIGAN

Soft going calls for O-P-E-N C-E-N-T-E-R traction

Euclid Model F 13-yard Bottom Dump with Goodyear Sure-Grips on tractor drive wheels and trailer — nonskids correctly reversed on latter.

Grip — and plenty of it — is what moves bigger earth yardages faster. And that means tough tires with a clean, sharp bite that won't clog up and spin helplessly under peak loads.

Top tire for such jobs is Goodyear's Sure-Grip with the great, time-proved O-P-E-N C-E-N-T-E-R *self-cleaning* tread which has no holding pockets, no mud traps to gum up.

See those big, unblocked channels on the Goodyear Sure-Grip pictured here? They sluice out dirt, mud and stones — leave the massive lug bars free and clear to bite deep and keep pulling in any going!

More and more contractors are specifying this great, longer-duty tire because it gives more drawbar pull, more speed, more round trips per shift, more yardage moved per day — *more work at less cost!*

What's more, Goodyear's exclusive multiple-compounded construction and the extra strength of Goodyear's Rayotwist cord carcass help make these the longest-lasting, hardest-working tires ever to roll a prime mover.

Best way to check these claims is to ask the men who have changed to Sure-Grips. When you do, chances are you'll want Goodyears on all your units.

THE RIGHT TIRE FOR EVERY JOB

HARD ROCK LUG for all rock work

ALL-WEATHER EARTH-MOVER for drawn vehicles

SURE-GRIP for drive wheels

Sure-Grip, All-Weather, Rayotwist—T.M.'s The Goodyear Tire & Rubber Company

A PRODUCT OF GOODYEAR RESEARCH

GOODYEAR

THE GREATEST NAME IN RUBBER

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

Construction Methods

ROBERT K. TOMLIN, Editor

Volume 26 | OCTOBER, 1944 | Number 10

Tank-Dozer

Spearheads Allied Advance in France

TANK-DOZER advances along road in France toward front lines. LaPlant-Choate bulldozer blade is mounted on General Sherman tank to form Army's new "break-through" weapon.

Photos, Signal Corps, U. S. Army

TANK AND BULLDOZER are combined in the Army's newly revealed "tank-dozer," which broke through the hedgerows and anti-tank obstacles of Normandy to spearhead the Allied advance across France. Developed in cooperation with Army Engineers and Ordnance by LaPlant-Choate Manufacturing Co., Inc., of Cedar Rapids, Iowa, it unites the work-power of the bulldozer with the fire-power, speed and armored protection of the medium Sherman tank. The 3½-ton hydraulically operated bulldozer blade, ingeniously mounted on an M-4 tank, gives the 40-ton tank-dozer an earthmoving capacity comparable to that of the largest size 20-ton tractor-dozer. Its destructive impact as a battering ram is almost twice as great because of the greater weight and speed of the tank.

The tank-dozer is applicable to any requirement for bulldozer power, tank fire-power and personnel protection. It will overcome anti-personnel obstacles such as barbed wire entanglements and mines, anti-mechanized obstacles such as log cribs, log posts, road craters, anti-tank ditches, concrete cubes, steel tetrahedrons, hedgehogs and anti-tank walls. It will reduce bunkers or pillboxes by covering over or destroying them and it is well adapted to emergency Engineer construction operations such as construction of jungle trails in the face of enemy sniper fire, building of bypasses under fire and the preparation of emergency stream crossings.

In Italy the tank-dozer was used to fill bomb craters in roads, push disabled vehicles off the road, construct bypasses around blown bridges, dig in half-tracks and other vehicles in forward position within enemy shelling distance.

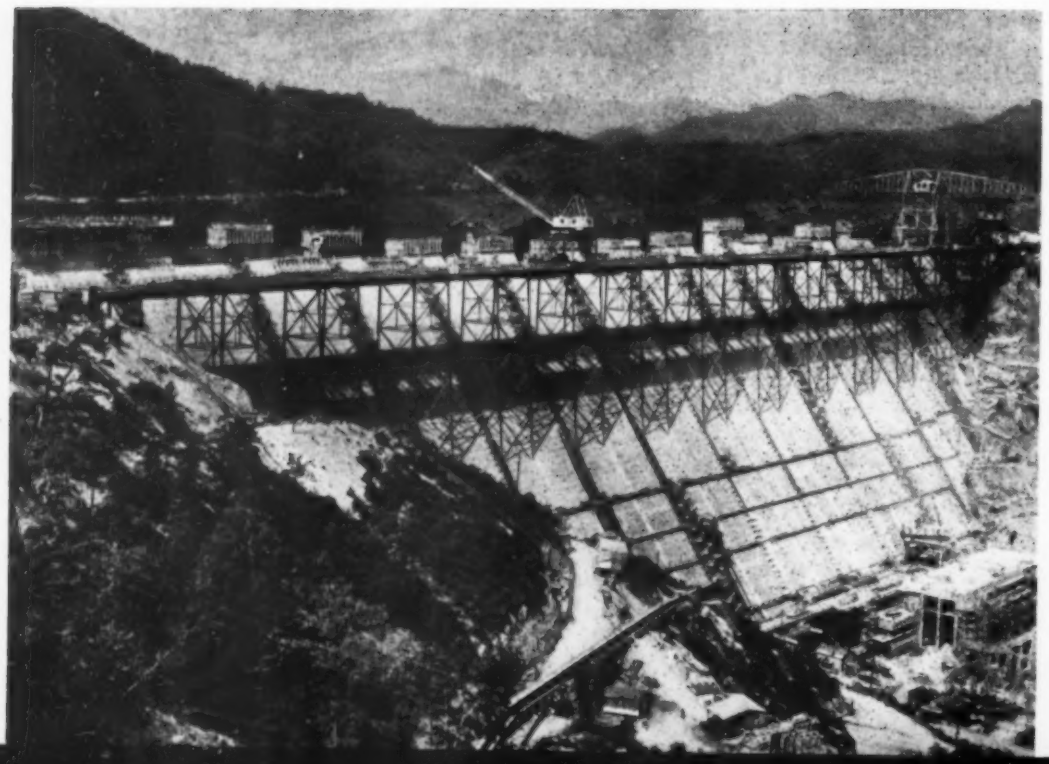
RUBBLE (below) in French town of Lonlay L'Abbaye is cleaned up by tank-dozer in vicinity of bridge bombed three times by Germans after American occupation.

THIS MONTH'S NEWS REEL

LONDON'S FIRST PREFABRICATED HOUSES are built at Middlesex. Steel framework and window frames are here in place. Construction of modern semi-detached houses, with up-to-date plumbing, electric lights, coal fires, and electric power plugs, can be completed in 15 days. British Combine Photo

SEABEES REPAIR TRACKS (below) of Saipan railroad. Using supplies that Japs had no time to destroy, U.S. forces reconstructed line and had it in operation within 2 weeks after capture of island. U. S. Marine Corps Photo

NATIONAL OFFICERS of Associated General Contractors of America (left) tour California to survey and discuss Western post-war plans. Pictured in San Francisco where they urged Western contractors to join national drive to force post-war construction planning to contract-letting stage are (seated, left to right): WILLIAM MUIRHEAD, national president, and H. E. FOREMAN, managing director, and (standing): GEORGE WILLIAMS, president of Central California chapter; HARRY A. DICK, national vice-president; and HOWARD HUNTLEY, president of Northern California chapter.

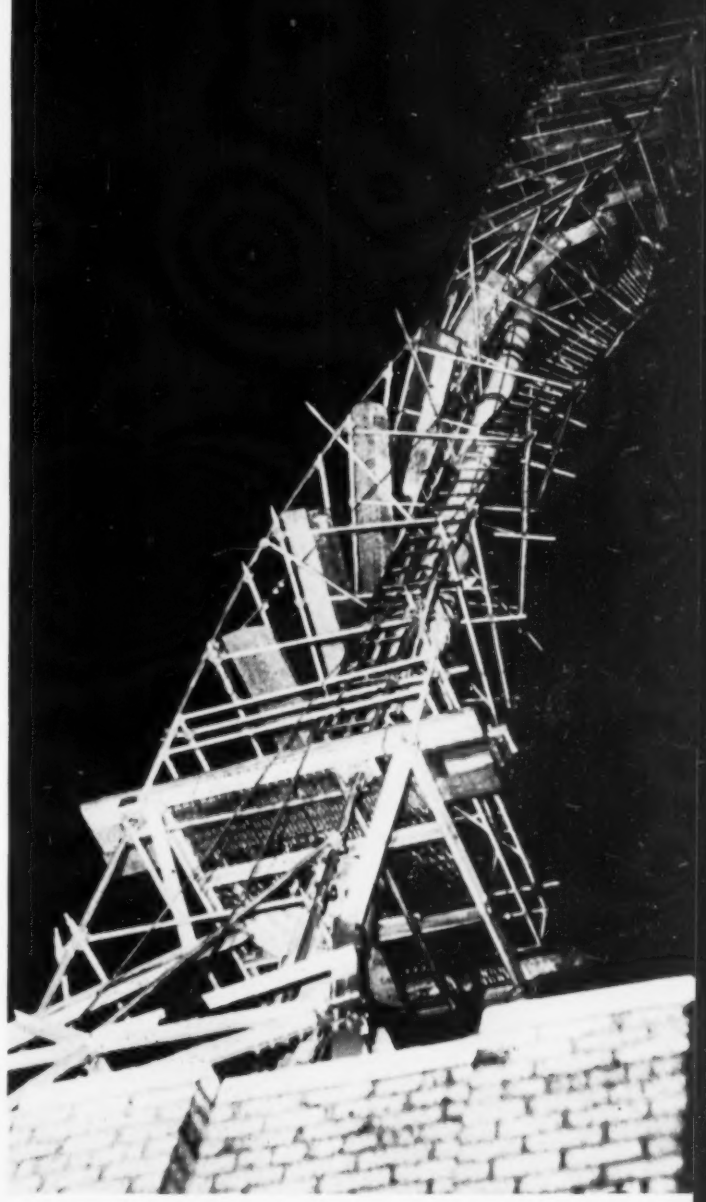


AS TVA'S FONTANA DAM (left), nears completion, blocks of concrete at extreme left are up to finished roadway level. One hammerhead and three whirley cranes are in operation on high trestle and one whirley is working from powerhouse trestle at toe of dam. Powerhouse and switchyard are at lower right. Several thousand feet of temporary stairs were built for workmen's access and those serving abutments and downstream face are visible.

FRENCH CIVILIANS cautiously pick their way across Marne River on bridge destroyed by retreating Germans at Chalons, France. Press Association Photo

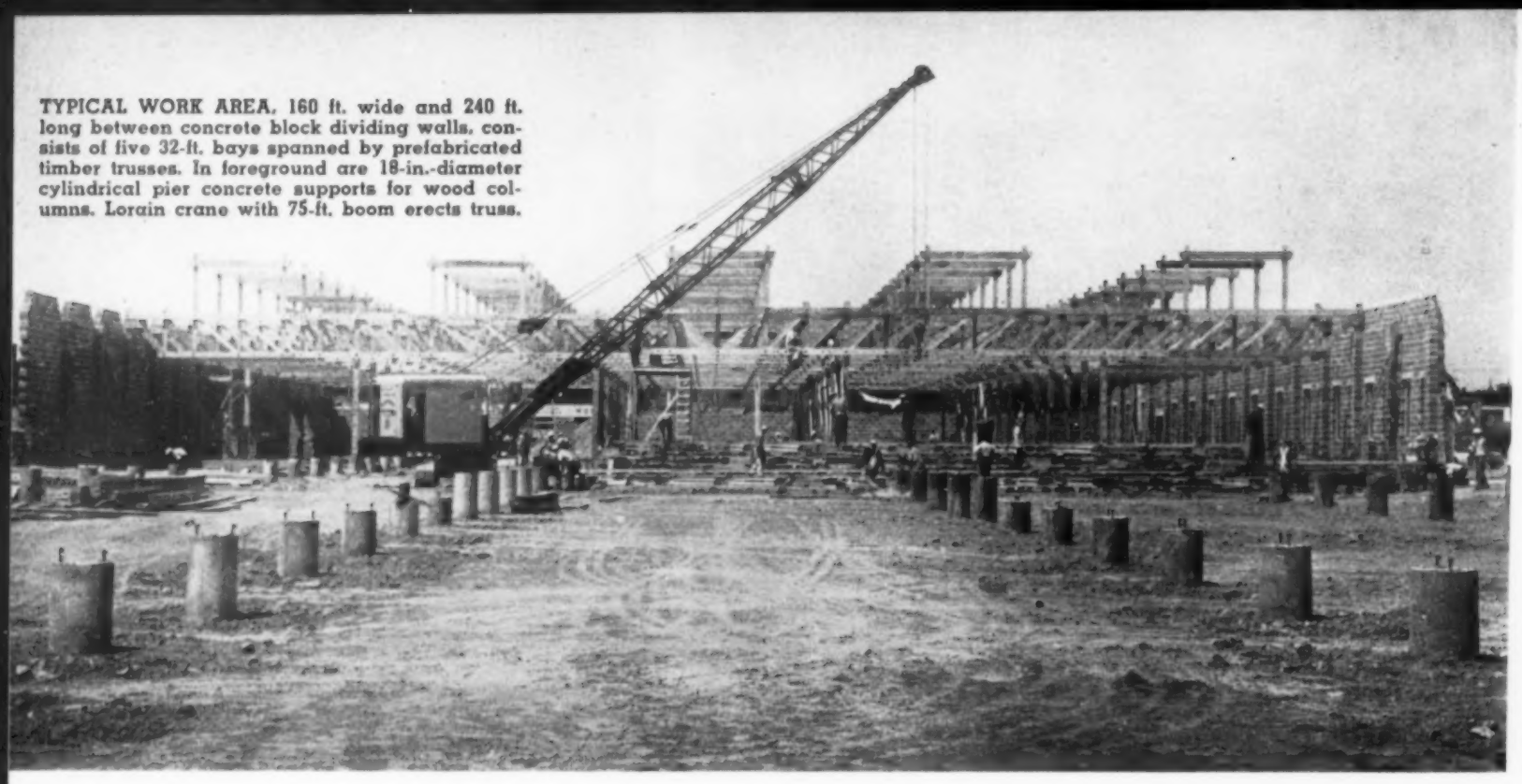
BRITISH ARMY PIONEERS after invasion of France repair section of main Cherbourg-Paris railway. British Official Photo

ENEMY MINES (below) are cleared by U.S. Army Engineers and beach for landings is leveled by bulldozers as troops move inland after invasion of southern France. Signal Corps Photo



NEW YORK HURRICANE bends 85-ft. steel scaffolding of Columbia Broadcasting System F.M. antenna on top of Salmon Tower Building at 42nd St. and Fifth Avenue. Police, fearful that wind which reached 85-mph. velocity would topple tower, roped off street to protect pedestrians. Acme Photo

GRAVES OF U.S. ARMY ENGINEERS (below) killed in action are marked by crosses formed of empty shell cases. Tops of mess kits serve as identification markers in this temporary cemetery.



TYPICAL WORK AREA. 160 ft. wide and 240 ft. long between concrete block dividing walls, consists of five 32-ft. bays spanned by prefabricated timber trusses. In foreground are 18-in.-diameter cylindrical pier concrete supports for wood columns. Lorain crane with 75-ft. boom erects truss.

14½-Acre Army Post Office

With 72-Day Time Limit on Construction Requires 943 Timber Trusses for Roof And 390,000 Concrete Blocks for Walls

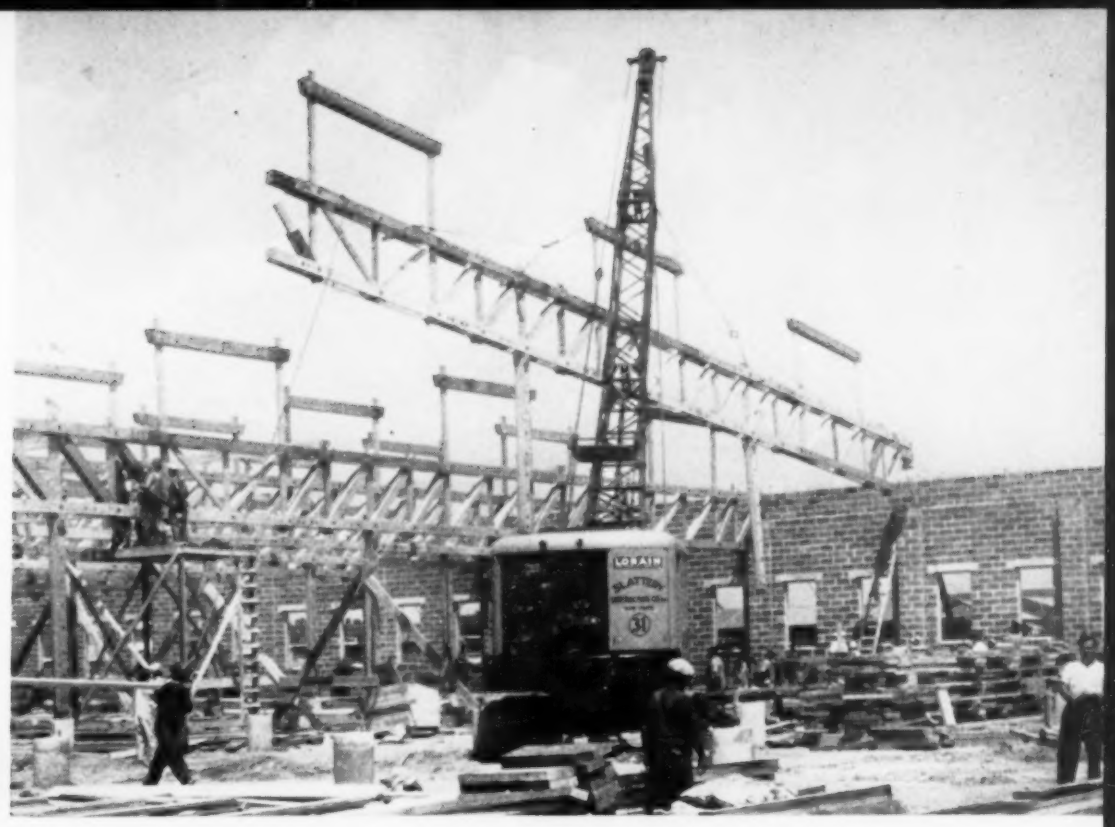
By ROBERT K. TOMLIN
Editor, Construction Methods

ONLY 72 DAYS was the time allotted to the John A. Johnson Contracting Corp., of Brooklyn, N. Y., for erecting the superstructure of the world's largest post-office building, an Army Engineer project of one-story timber roof-truss and precast concrete block wall design, with a floor area of nearly 14.5 acres, where a huge daily volume of package and paper mail for members of American fighting forces overseas will be received, sorted and dispatched to APO addresses almost everywhere on the face of the globe. The Army's new Postal Concentration Center, as it is officially designated, occupies the site in Long Island City, N. Y. of the Madison Square Garden Bowl, open-air boxing arena where James J. Braddock, on June 13, 1935, won the heavyweight championship from Max Baer. Among major items in the bill of materials called for by the huge project are 2,600,000 b.ft. of lumber in 943 prefabricated trusses and 390,000 concrete blocks for the walls of the structure.

Every phase of the job—the preparation of plans and specifications, letting of contracts, obtaining necessary materials and equipment, recruiting an adequate force of skilled labor, and conducting construction operations at the site carried a "RUSH" tag. The main reason for haste was dictated by the necessity of having the post-office building.

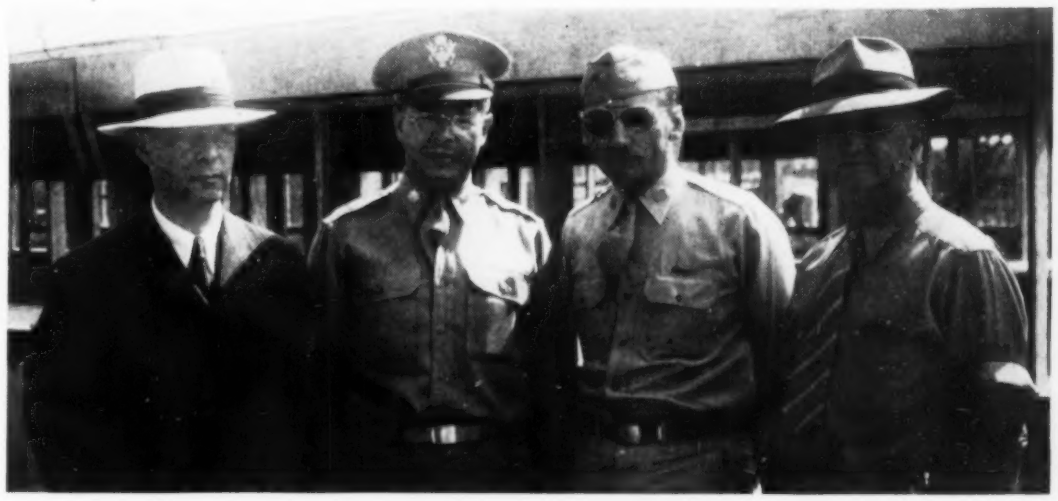
FINISHED INTERIOR of work area (left) shows roof trussss, concrete block wall, wood columns on concrete pedestals and concrete floor with resilient asphaltic surface.

COLONEL EDGAR W. GARBISCH, head of Army's New York District Engineer Office, directed construction of huge Postal Concentration Center.

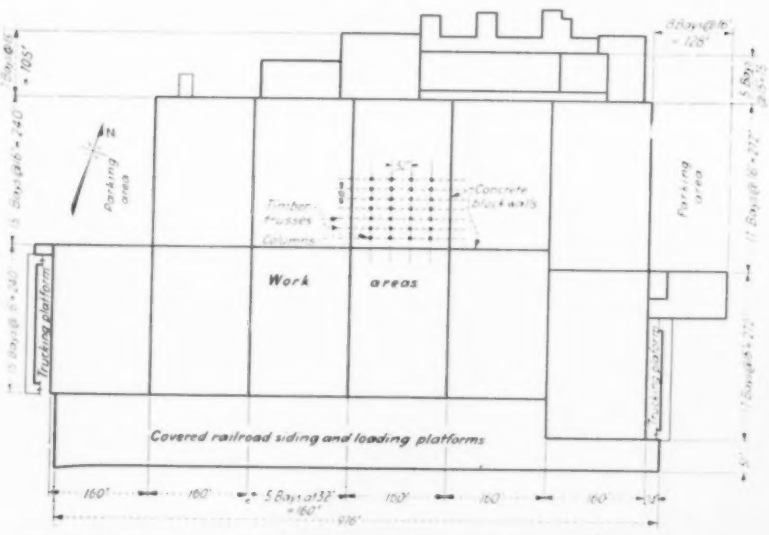


SECTION OF TIMBER TRUSS about 88 ft. long is raised by Lorain crane to seat on concrete-block wall. A second truss section about 72 ft. long will be spliced to one shown to span 160-ft. width between dividing walls.

for which plans were started May 16, ready for workable occupancy by Sept. 1, in time to handle for delivery abroad before Dec. 25 the millions of Christmas packages and papers addressed to G. I. Joe in theaters of war. The building, as indicated in the accompanying plan, has a maximum overall length of 976 ft. and a maximum width of 619 ft. It is divided by interior load-bearing fire walls of cinder concrete block into "work areas," each 160x120 ft. in plan, in addition to four other walled areas of different dimensions along the east side of the structure for the exclusive use of Army postal personnel. Along the north side are additional areas devoted to administrative



INSPECTION OF PROGRESS on Postal Concentration Center project is made by (left to right): WALTER H. WEISKOPF, head engineer; LT. COL. CHARLES K. PANISH, chief, engineering division; MAJOR C. A. RIPPERGER, in charge of construction; and PETER F. FLORENCE, resident engineer, all of the New York District Engineer Office.



GROUND PLAN of Postal Concentration Center, covering 630,000 sq. ft., shows 160x240-ft. "work areas" separated by cinder concrete block walls.

CINDER CONCRETE BLOCKS (below) are built into wall by masons on scaffolding. Project required 390,000 steam-cured concrete blocks.

PANEL FORMS WITH PLYWOOD FACES carried in 2x3-ft. steel frames are used for concrete foundation walls.

CYLINDRICAL STEEL FORMS, in halves, are set for 18-in.-diameter column pedestals on spread footings. In foreground is completed section of concrete foundation wall.

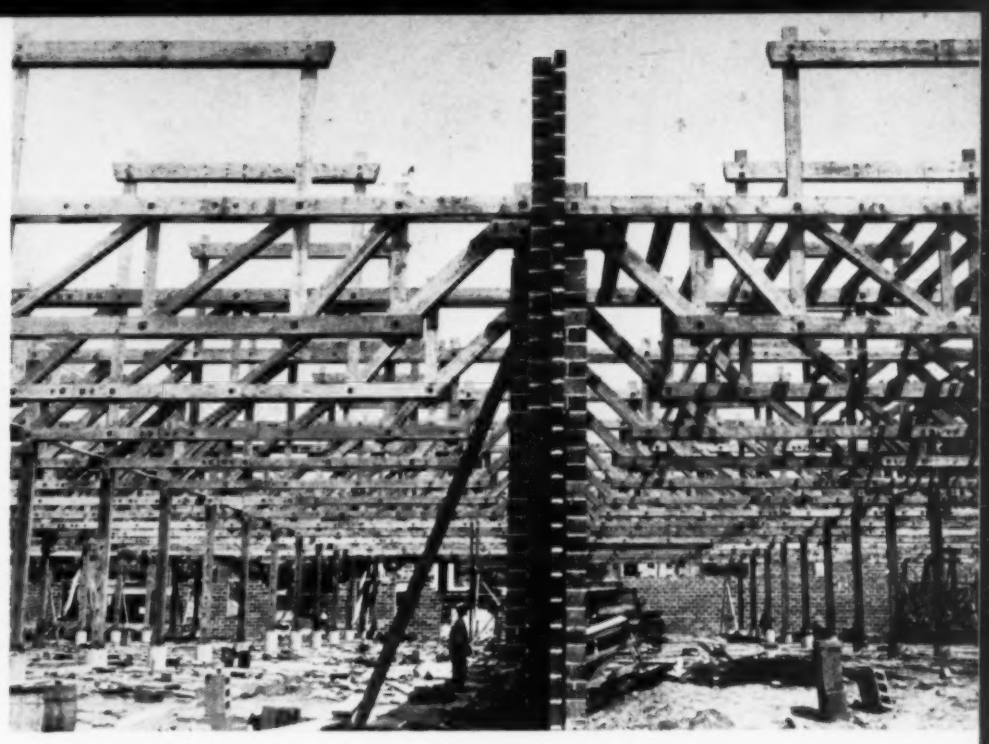
offices, locker rooms, cafeteria and washrooms. The roof over the working areas is carried by timber trusses of 32-ft. span, of which there are 814. In addition to the 32-ft. span trusses are similar trusses of 40, 45, 47, 49 and 66-ft. span, making a total of 943 trusses in the structure. When in use the Postal Concentration Center will be operated during peak loads by 2,500 Army and about 7,000 total civilian employees, operating 24 hr. a day on 3 shifts.

Speed Governs Work—Here are a few facts that indicate the speed with which the project has been handled: On May 16, Col. Edgar W. Garbisch, New York District Engineer, received from the Chief of Engineers, U. S. Army, at Washington, D. C., a directive to build the Postal Concentration Center and have it ready for workable occupancy by Sept. 1, thus allowing only 3½ months to prepare de-

SUBSTRUCTURE CONCRETE (below) delivered by truck-mixers is carried to forms by bucket attached to boom of crane.

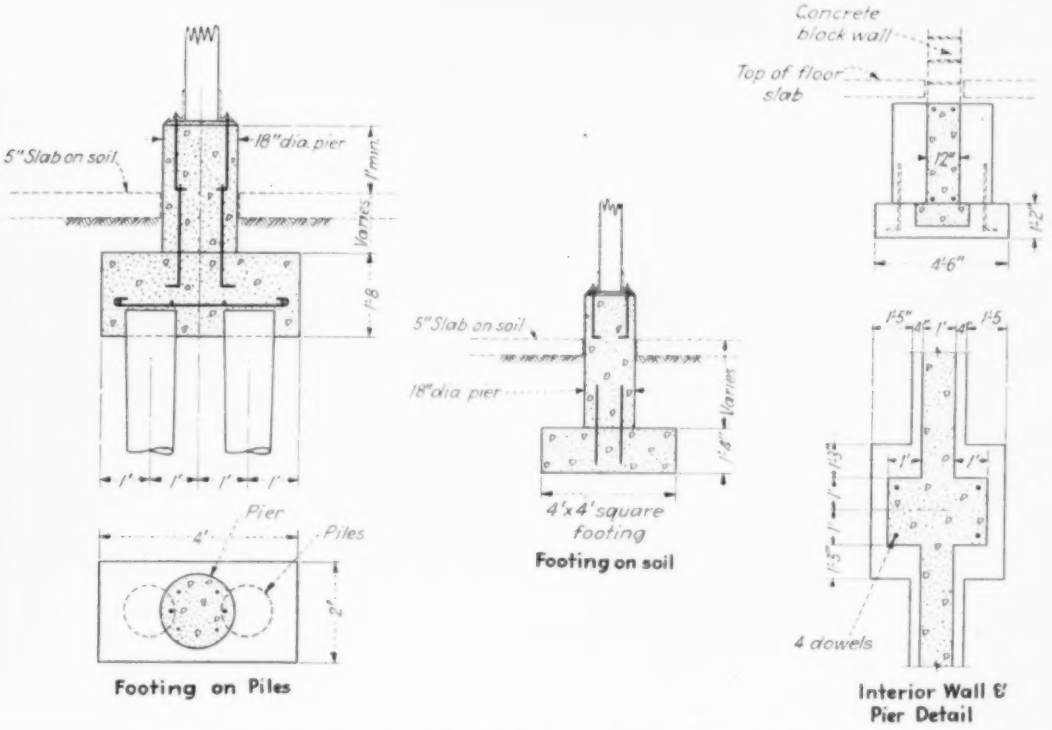
PEDESTAL FORM (below) is in position to receive concrete at top deep footing.

INCLINED CONVEYOR carries cinder concrete block to scaffold where masons are laying up wall.



LOAD-BEARING WALL between work areas of building is of cinder-concrete-block construction.

LAMINATED TIMBER COLUMNS consisting of three 3x10's bolted together are anchored to tops of pedestal supports.

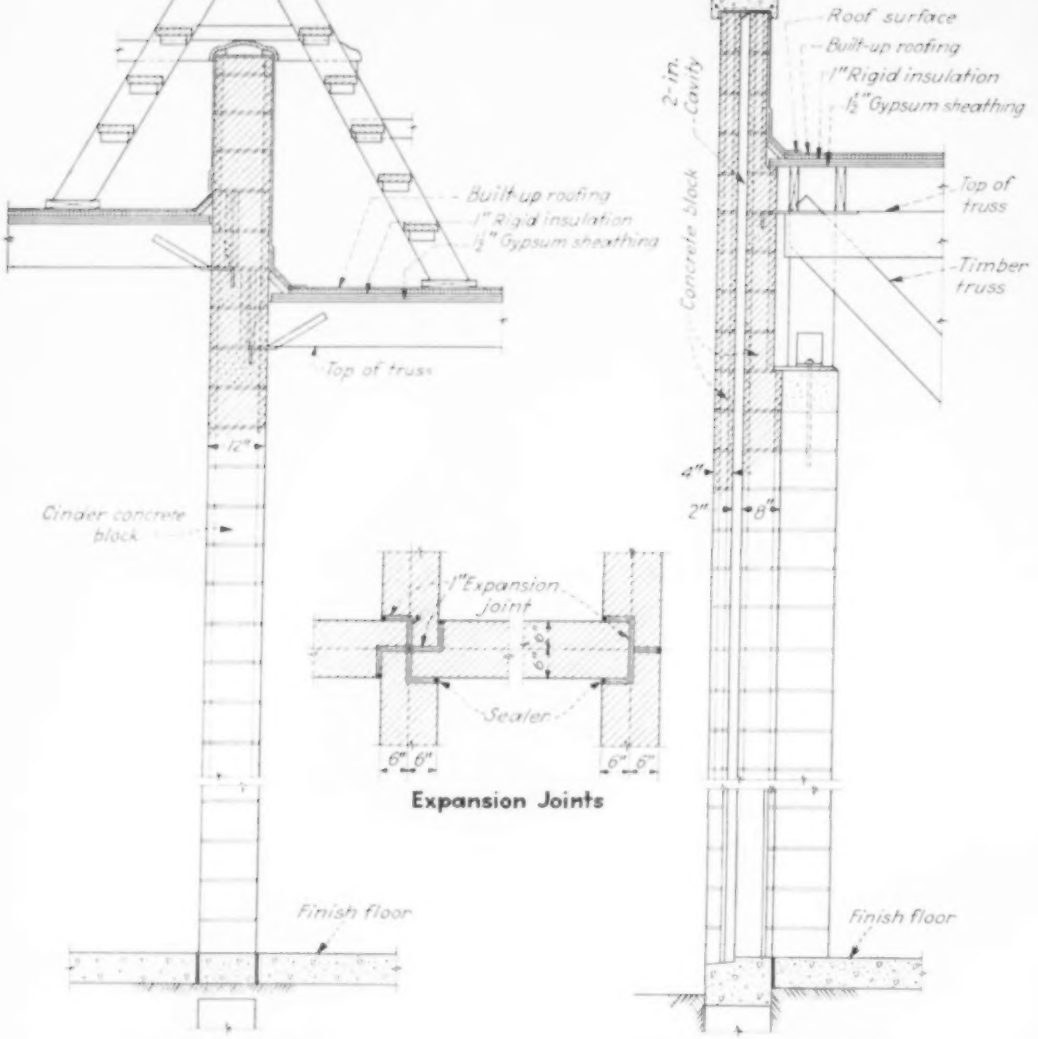


SUBSTRUCTURE DETAILS show concrete footings on piles and on soil, and interior wall and pier design.

tailed plans and specifications, let contracts and complete construction of a building calling for about 630,000 sq. ft. of floor area, in addition to loading platforms, parking areas, railway spurs and a large boiler plant.

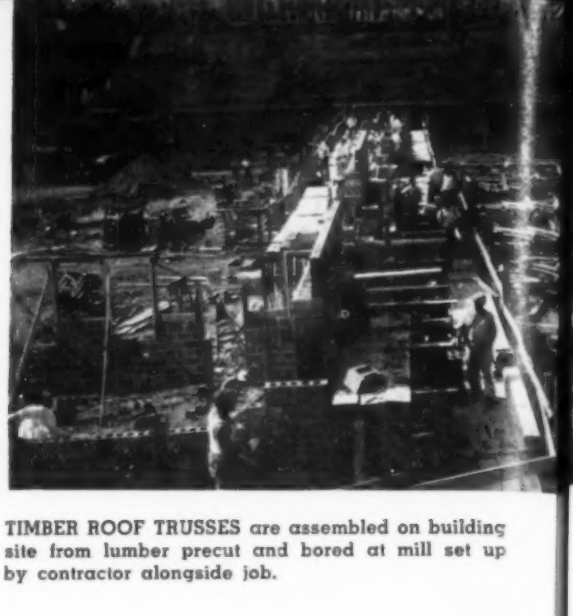
Alfred Hopkins & Associates, of New York, were engaged as architect-engineers to design the project. Ten days after a meeting with the Army Engineers on the night of May 16, the Hopkins organization had drawings and specifications for the foundations completed and the contractor commenced work on May 26, 1944. The specifications and detailed

ON CONCRETE FOUNDATION WALLS (right) masons are starting to lay precast blocks on concrete mixed with clean cinders.



Expansion Joints

CONCRETE BLOCK WALLS are of two types, both load-bearing, for interior division and exterior closure. Exterior walls are of cavity type with 2-in. insulating air space between blocks.



TIMBER ROOF TRUSSES are assembled on building site from lumber precut and bored at mill set up by contractor alongside job.

working drawings for the superstructure of the post-office building, including the boiler plant, water, gas and electric services, were completed at 9:00 a.m. Monday, June 12, 1944, thus requiring only 25 days to finish this phase of the emergency job.

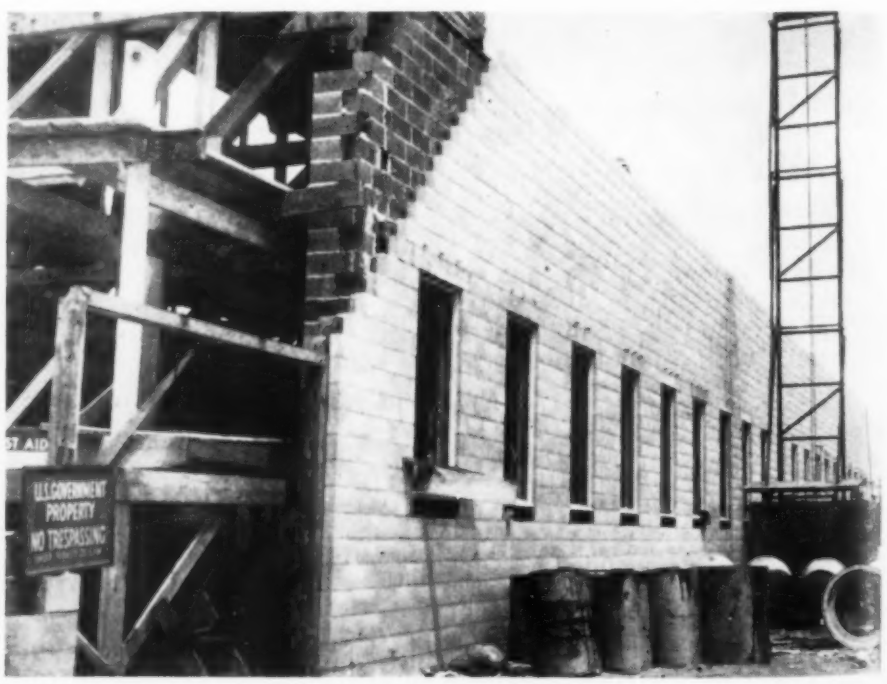
To expedite construction the project was divided into its three main construction elements: (1) grading of site; (2) piledriving and concrete substructure; and (3) superstructure. Separate lump-sum contracts were let, successively, for each of these operations, as follows:

Grading: $30,390 to Charles F. Vachris, Inc., Brooklyn, N. Y.

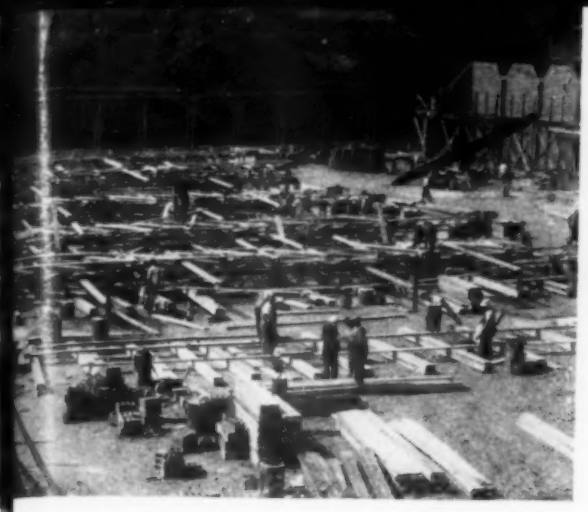
Foundations: $199,775 to Cayuga Construction Corp., New York.

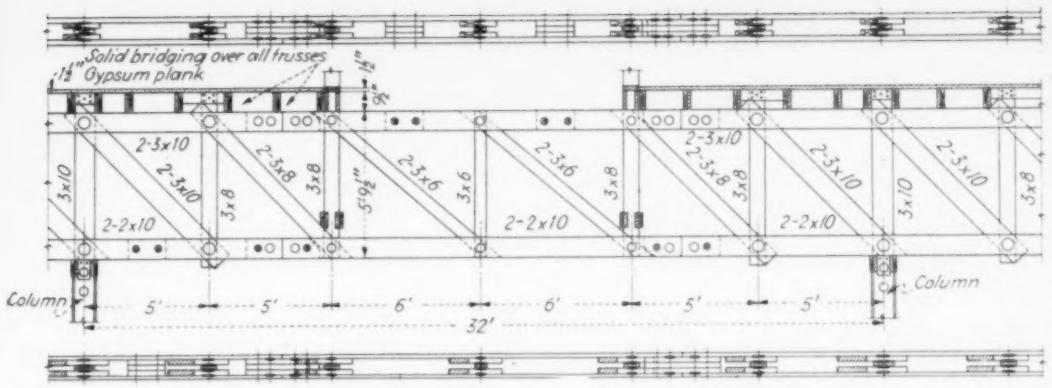
Superstructure: $2,335,916 to John A. Johnson Contracting Corp., Brooklyn, N. Y.

FIRE-WALL CONSTRUCTION (left) is done with 12-in.-wide cinder-concrete block. Concrete-block piers are built into wall at points where ends of timber roof trusses are seated.



CAVITY TYPE WALL, comprising 8-in. cinder-concrete block on inside, 2-in. air space, and 4-in. buff-colored cement-sand block, is used for exterior of huge post-office building.



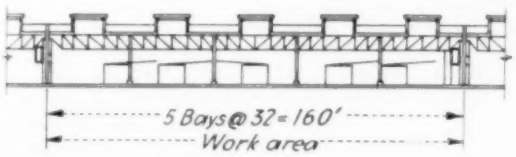


PREFABRICATED TIMBER TRUSSES are mostly of 32-ft. span with diagonal members all running in one direction to simplify joint details and speed up assembly.

While the grading of the site was in progress plans were being completed for the piledriving and concrete foundation work and while the substructure was being built detailed drawings were rushed to completion for the superstructure, on which construction was started June 19. Each operation following literally on the heels of its predecessor.

Design Features—Two major considerations guided the planning of the immense building: (1) Simplification of design to insure extremely rapid construction; (2) availability for quick delivery of ample quantities of non-critical building materials. On this basis a steel-frame structure was ruled out and the decision was made to use timber roof trusses prefabricated with bolts and split-ring connectors, precast load-bearing concrete block walls, gypsum plank roofing and

TYPICAL WORK AREA (below) is 160 ft. wide and consists of five 32-ft. bays spanned by prefabricated timber trusses supporting monitor type roof.

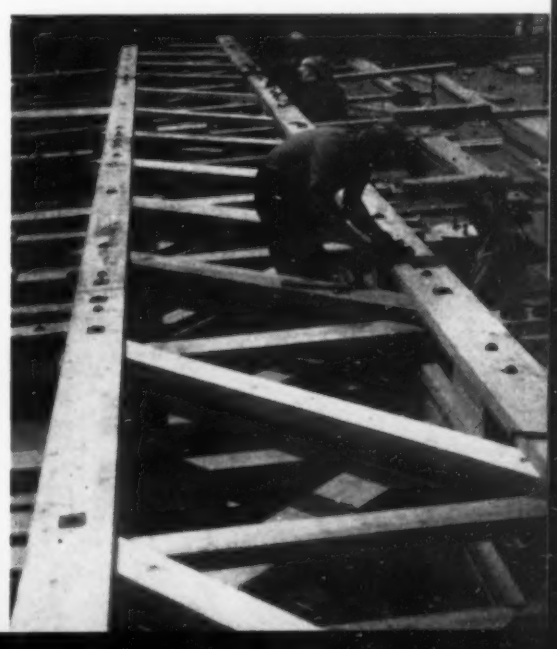


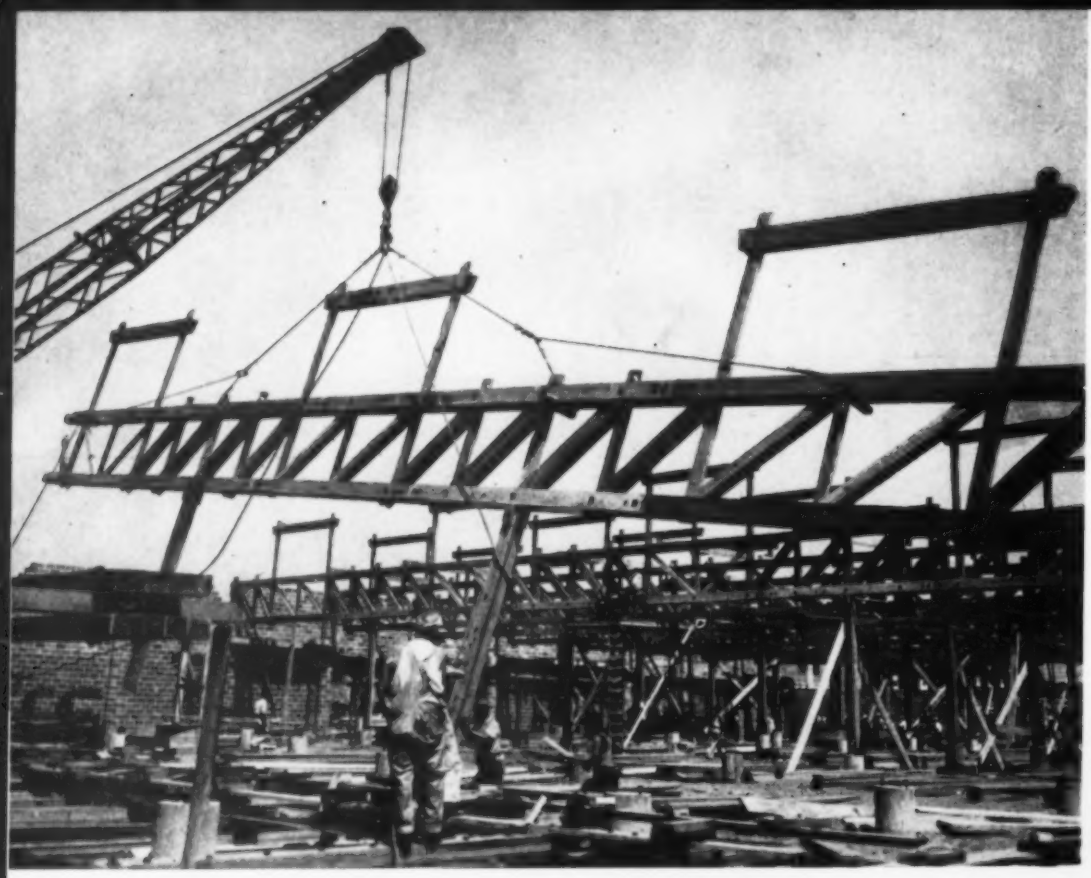
PETER F. FLORENCE (left) is resident engineer for U. S. Engineer Department. **GROVER ADAMS** (center) is general superintendent in charge of construction for John A. Johnson Contracting Corp. **WALTER OLSON** (right) is project manager for John A. Johnson Contracting Corp.

WORK BENCH AT LUMBER MILL (below) is designed for assembly line methods. Here electric drill routs out circular groove in truss timber for split-ring connector.

BOLT HOLE (below) is bored through several thicknesses of lumber at joint by Black & Decker electrically powered drill which is fitted with wood-boring auger bit.

NEARLY COMPLETED TRUSS (below) shows diagonals all running in one direction to simplify joint fabrication. All timber trusses were prefabricated at site of projects.





PREFABRICATED TRUSS SECTION includes timber columns and framing for roof monitors, handled as unit by crawler crane.

WORLD'S LARGEST POST OFFICE covering floor area of 630,000 sq. ft. requires 943 timber roof trusses and 390,000 precast concrete masonry blocks for walls.

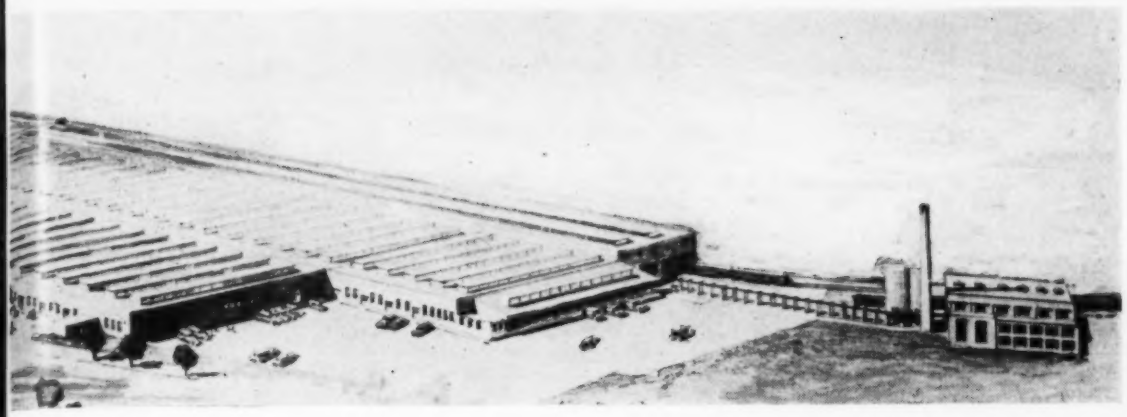
concrete floor with a resilient bituminous surfacing.

Design features throughout were adapted to the needs of simple, speedy construction by employing a gridiron plan using modular elements based, for the most part, on a 16-ft. dimension. Thus in the work areas of the building column spacing is 16 ft. on north-south and 32 ft. on east-west, axial lines. Roof truss spans are mostly 32 ft. and "work areas" inclosed by interior walls of cinder-concrete block have lengths of five 32-ft. bays, or 160 ft. This adherence to dimensions constituting multiples of 16 ft. simplified and speeded the work of prefabricating the roof trusses at a lumber mill set up on the job site. All in all, in the design of the post office the Hopkins organization, headed by Clarence B. Litchfield and Lester LaPierre, and the District Engineer Office exhibited an awareness of the construction problems involved and the need for speedy erection in the field.

Grading Site—The preparation of the site for the building involved a unique operation. The plot along Northern Boulevard between 42nd and 48th Sts., in Long Island City, was occupied by the boxing arena known as Madison Square Garden Bowl, which had been formed by scooping out a depression in the original surface and piling the excavated material around the hollow to form a circular embankment on which tiers of seats were installed. The "bowl" thus formed was about 800 ft. in diameter at the top, with its bottom, or boxing ring, about 17 ft. below the original ground surface. The sloping sides of the bowl were paved with asphalt.

The first of the three contracts for the project, therefore, required the leveling off of the site to specified grade and the filling in of the prize-fight bowl. For this work Charles F. Vachris, Inc., starting work May 16, used a fleet of 8 LeTourneau carryall scrapers hauled by Caterpillar tractors, one power shovel and a sheepsfoot roller to consolidate the fill within the bowl area. The asphalt paving on the sloping sides of the arena was broken up (so as not to impede drainage) by tractor-hauled rooters and left in place to be covered by compacted earth fill. The job involved the move-

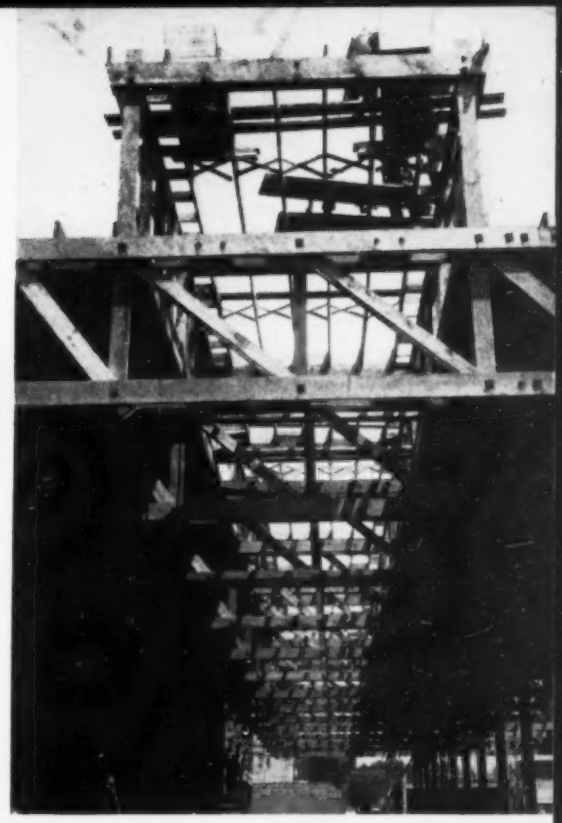
SITE OF PROJECT (left) was formerly occupied by Madison Square Garden Bowl in Long Island City, New York, open air boxing arena which had to be filled in and graded.



GRADING OF MADISON SQUARE GARDEN BOWL SITE (below) by Charles F. Vachris, Inc. involves movement of 80,000-cu. yd. of earth with LeTourneau scrapers hauled by Caterpillar tractors.

ment of 80,000 cu. yd. of earth. The filling of the bowl required 65,000 cu. yd. and the surplus material not needed to bring other parts of the site to grade was stock-piled for future use in grading floor areas or disposed of. The soil at the site consisted of a layer of silt of varying thickness overlying sand. The Vach-

ENDS OF ROOF TRUSSES (below) are seated on concrete-block piers built as integral parts of dividing walls. Carpenters are placing 2x10-in. rafters, spaced 2 ft. apart on top chords of trusses.



MONITOR is ready for roofing. Truss assembly includes monitor for each 32-ft. span.

GYPSUUM PLANK FOR ROOF COVERING (right) is raised from truck in special sling hoisted by crane.

SUBSTRUCTURE FOR ARMY POST OFFICE (below) by Cayuga Construction Corp. required driving of 29,000-lin. ft. of wood piles up to 40 ft. in length. In this view piles are being driven to support railway loading platform along south of project.

SLING ON CRANE (below) delivers load of gypsum plank to roller carriage running on planks along roof of post-office.

ROLLER CARRIAGE ON PLANK TRACK carries load of gypsum planks which are pushed ahead for use of roofers, here shown at work on one of the monitors.

ris crew completed the grading of the site in 9 days, making its exit from the job as forces of the Cayuga Construction Corp. arrived May 26 to drive piles and install concrete footings required for the substructure.

Foundations—The substructure contract of the Cayuga Construction Corp, awarded on May 26, involved the driving of 29,000 lin. ft. of wood piles, up to 40 ft. in length, to support column footings and foundation walls of concrete in an area on the west side of the site where soft material was encountered, along the line of loading platforms at railway spurs on the south end and at the location of the boiler plant in the southwest corner. Over the rest of the area, however, the original soil and the fill in the bowl, which had been thoroughly compacted, offered adequate support for the comparatively light loads of the one-story post-office structure without resort to piles. Equipment for piledriving comprised two Bucyrus-Erie and one Marion steam cranes, with vertical leads carrying Vulcan hammers.

In those areas where piles were required, each building column support

FROM CHUTES ON TRUCK-MIXERS concrete is delivered for 5-in. thick floor slab, reinforced with steel wire mesh.

HAND FLOATS AND MECHANICAL FINISHER, Kelley electrically powered machine with rotating disk, smooth $\frac{5}{8}$-in.-thick surface of Kompocrete floor finish.

RUBBER-WHEELED BUGGIES (left) deliver load of Kompocrete resilient asphaltic floor finish.

usually consists of two piles with a rectangular concrete cap 2x4 ft. in plan and 1 ft. 8 in. thick, with four $\frac{5}{8}$-in. steel dowels 2 ft. 6 in. long extending up into a cylindrical concrete pedestal 18 in. in diameter to which the wood columns carrying the roof trusses are attached by anchor bolts. These pedestals extend a minimum distance of 1 ft. above

(Continued on page 106)

JOB oddities

ROPES OF TWISTED BAMBOO support 1,800-ft. suspension bridge across two main canals of China's Min River. Canals are below 2,200-year-old dam which provides irrigation for Kwanhsien-Szechwan province. Project was started by Governor Li Ping about 250 B.C. Chinese News Service Photo

ROLLER BORROWED from French farmer and weighted with two 500-lb. bombs levels RAF Spitfire landing strip in Normandy. It is attached to jeep driven by pilots of Australian squadron, one of whom sits behind on roller to steady bombs. British Combine Photo

AMERICAN SOLDIER driving bulldozer helps pull heavily loaded wagon of Italian civilians up steep grade somewhere in Italy. Signal Corps Photo

NEW USE FOR STEEL GRATING (below) of type installed on street vents over subway lines is envisaged in non-slip back porches developed by Irving Subway Grating Co., Long Island City, N. Y., to reduce accidents to housewives in post-war homes. Snow drops through grating, leaving platform clear.

IMPROVED ARMOR PLATE SHIELD (below) protects American bulldozer operator with Engineers of 37th Division in Solomons from Jap snipers who are ordered to concentrate their fire on bulldozer because of their great importance in supplying jungle troops.

ACCESS HIGHWAY is built in Canyon del Pato. Rock tunnel of project is being driven well back from face of opposite side of gorge.

ACCESS TRAIL is built to serve tunnel adit. All movement of men, materials, equipment and supplies is over such trails.

MEMBERS OF EXECUTIVE STAFF (right) are: (center) BARTON M. JONES, engineer-director. To his left is RAUL QUINONES. At extreme left is ANDREW M. KOMORA. To right of Mr. Jones is JOHN FORBES, assistant supervisor on tunnels. Extreme right, Peruvian foreman of adit No. 2.

Peru Hydro Plant

Started with Hand Labor, Will Use American Equipment for Rock Tunneling and Dam Construction—Cost, $6,000,000

MAIN CAMP (below) is near mouth of canyon. White buildings in foreground are permanent for administration and operating staff. To right in background are quarters and facility buildings for construction forces.

FEATURES OF PERUVIAN HYDRO PROJECT

- Difficult construction at isolated, mountainous site
- Diversion dam
- Tunnel 5.7 mi. long in granite
- Vertical penstock shafts sunk with calyx drills
- Access roads on canyon face
- Transportation cableways
- Construction camps

POWERHOUSE SITE in mouth of Canyon del Pato (looking upstream) is in an underground cavern being excavated about ¼ mi. in from face of mountain in background. Outlet of tailrace tunnel is at (A). At (B) is portal of railroad access tunnel to powerhouse cavern. At this point bridge (C) will span gorge to provide connection to railroad, whose tunnel (D) is at right.

PORTAL OF DIVERSION TUNNEL through which stream will be carried during construction. Hand drilling and mucking were used until machinery and equipment could be obtained.

PROBLEMS OF TRANSPORTATION, organization and construction that are being solved in building a 125,000-kw. high-head hydroelectric plant immediately west of the high Andes in an isolated section of Peru indicate the possibilities of combining modern methods with local practices in conducting many operations that promise a wide post-war field for American engineers and contractors in the countries south of the Panama Canal. Already about 20 percent completed, the project is expected to proceed rapidly as construction machinery and equipment recently released for shipment from this country are installed.

This undertaking, locally known as the hydroelectric project of the Canyon del Pato, is situated about 85 mi. inland from Chimbote. A narrow-gage railroad extends from the best natural harbor on the west coast of South America on which Chimbote is located to a point directly below the project.

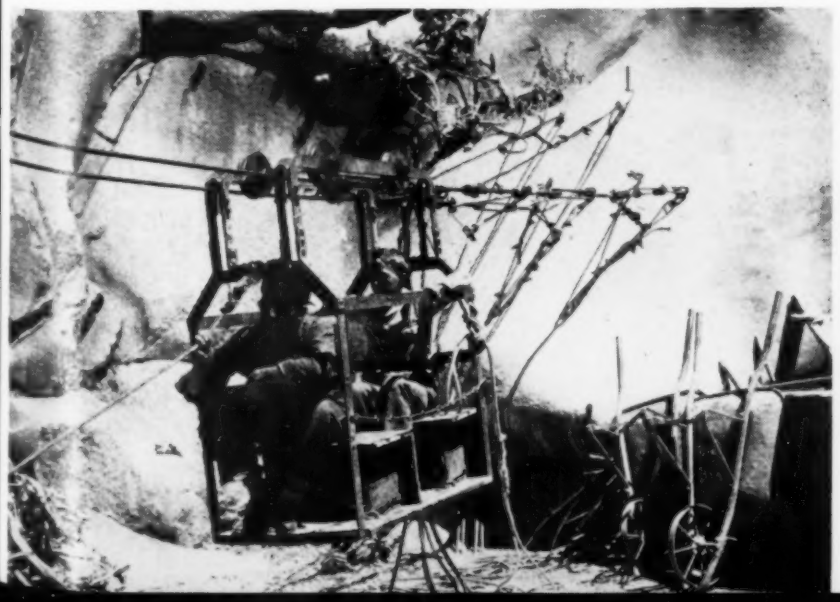
Water is to be taken from the Santa River, a bold torrent that has its sources in 110 mi. of perpetual snow and glaciers on the main range of the Andes. This range includes 22,200-ft. Mount Huascaran, the second highest peak in South America.

Immediately above the site of the powerhouse of the project, the stream passes through one of the deepest and most rugged canyons in all of South America as it cuts westward to the Pacific across the coast range. Water is to be diverted

(Continued on page 144)

ANCHORAGE OF TWO-LINE CABLEWAY (below) is in solid granite wall of canyon. Workmen and supervisory staff are transported from access highway across canyon in carriages. Materials and supplies are moved in special 3½-ton buckets.

AT SITE OF MAIN DAM (below) little rock has to be removed to reach uniform solid granite foundation.

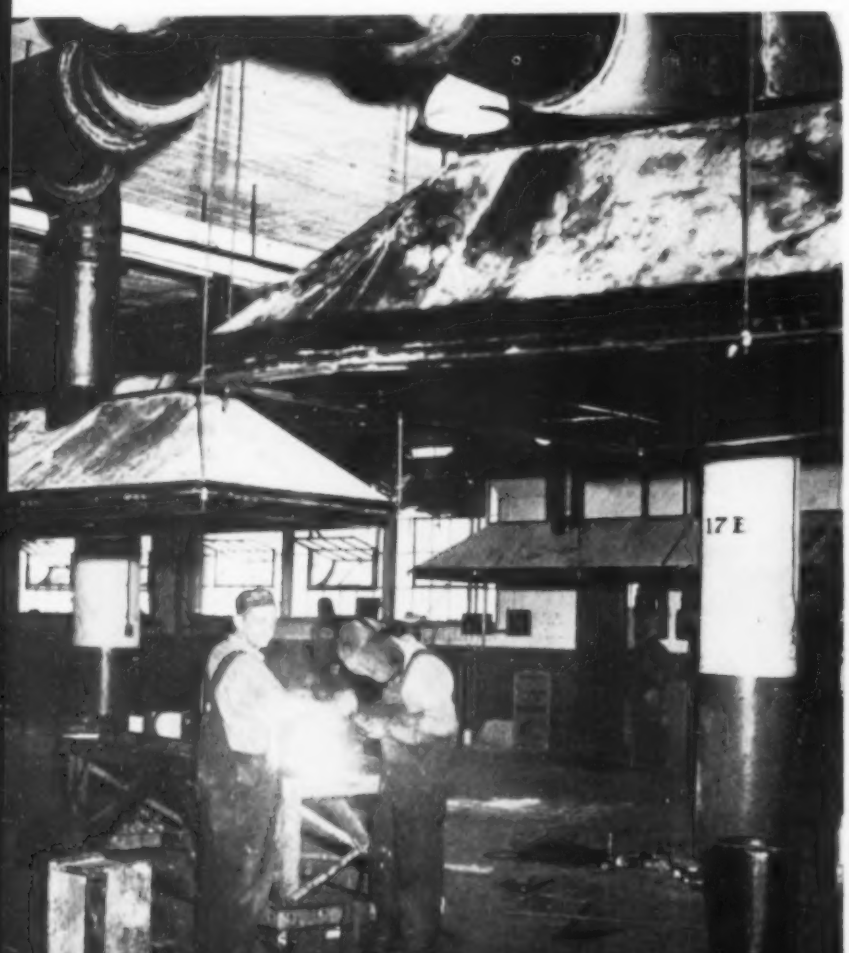


AMMUNITION FACTORY *Reconverted* FOR BATTERY PRODUCTION

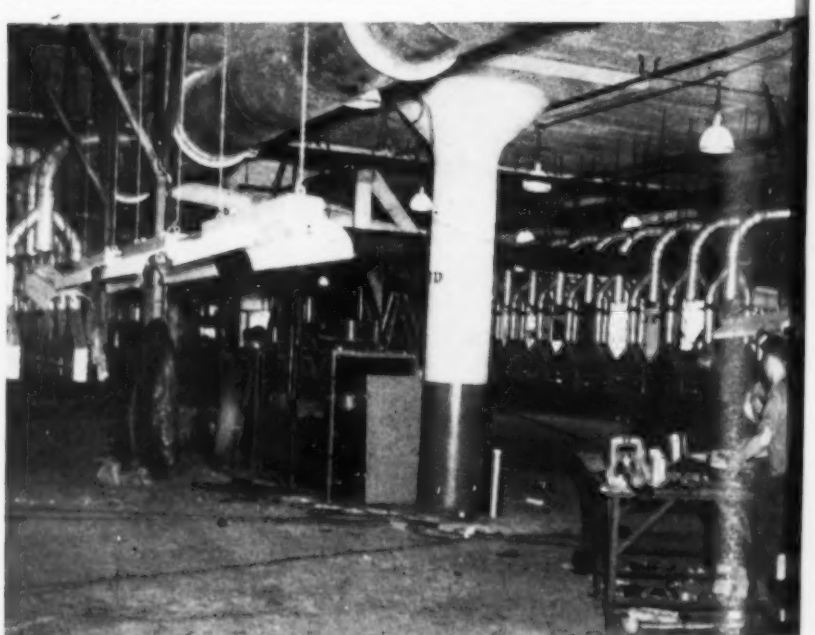
FIVE-STORY FACTORY of reinforced-concrete flat-slab construction with total floor area of 10 acres is converted from ammunition manufacture to making of dry-cell batteries at Milwaukee Ordnance Plant.

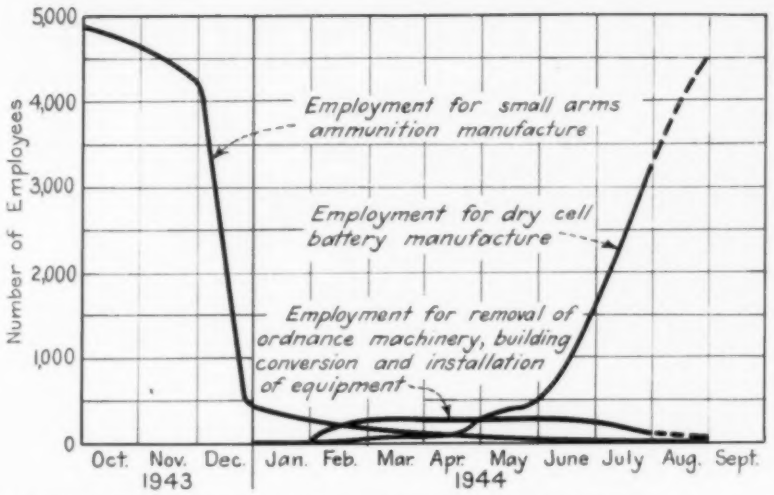
RECONVERSION of a five-story reinforced-concrete factory of 443,000 sq.ft. total floor area from small arms ammunition manufacture to dry-cell battery production at the Milwaukee Ordnance Plant called for extensive alterations and additions to the piping, wiring and ventilating systems inside the building, as well as rearrangement of partitions to fit the new layout. Making a quick start on the conversion job February 1, before a single drawing of the new plans had been prepared, the U. S. Engineers substantially completed the remodeling and re-equipping of the factory in six months with the aid of two able local contractors, Hans Lochen & Son, Inc., Milwaukee, for removal of the ordnance production machinery, and the Klug & Smith Co., Milwaukee, for converting the building and installing the battery production equipment. Work under the first contract amounted to about $200,000, and under the second to about $550,000.

SHEET-METAL HOODS (below) and ducts are erected to remove fumes from hot asphalt used in making battery cores on three parallel core lines. Band for pipe duct is being welded with power from portable Lincoln welder.

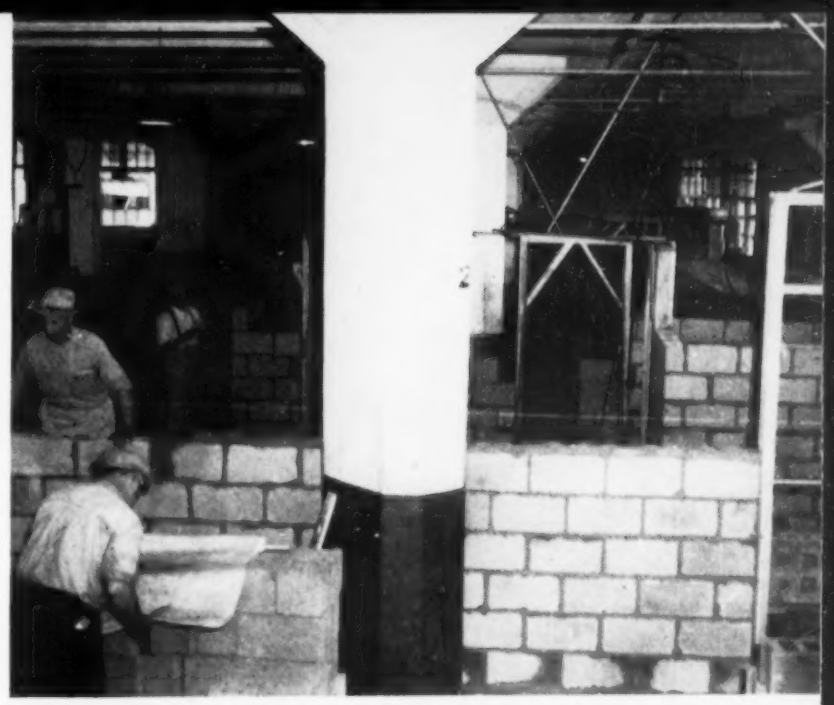


EXHAUST HOODS (below) arranged in series over battery core lines are designed to take away fumes of hot waxes and resins employed in sealing cores. Sheet-metal workers use portable bench to fabricate ducts and hoods.





FACTORY EMPLOYMENT drops abruptly with stoppage of contract for ammunition manufacture. Five weeks after conversion of plant is started for battery production, employment of factory workers resumes and increases at accelerated pace toward planned peak six months later. Maximum employment by contractors for machinery removal and plant conversion is about 275 men. Conversion is practically completed in six months.



MASONS LAY CONCRETE BLOCK in partition walls of kitchen and cafeteria to serve plant's 4,500 employees on three shifts.

New factory layouts for battery production were planned by the Signal Battery Co. under an architect-engineer contract with the Corps of Engineers, the Klug & Smith Co. doing much of the detailed design work as architect-engineer's agent. The factory continues in direct war production, with the Signal Battery Co., under a contract with the Signal Corps, taking over the floor space formerly used by the U. S. Rubber Co., which made the ammunition for the Ordnance Department.

Production of .50 caliber small arms ammunition in the plant was stopped in November. Employment almost immediately dropped to less than 500 from a maximum of 6,500. Removal of machinery by the Lochen crews started on the first of February, and the Klug & Smith Co. simultaneously took the first steps toward converting the building. A training line for battery workers was in operation on March 10, and battery production is expected to build up to a total of 4,500 employees on

TO TAKE CHARGE of factory conversion, Maj. GEORGE S. DENITHORNE, C.E., (right) returns from foreign fields to become resident engineer at Milwaukee Ordnance Plant, where he directed original construction for U. S. engineers.

WIRING FOR LIGHTS (below) is installed by electrician on rolling Safway scaffold. Concrete-block partitions inclose storage rooms for kitchen of reconverted factory.

PUSHED UPWARD (below) by improvised foot lever bearing against lower end of vertical wooden extension to which tool is fastened, Milwaukee electric hammer drill cuts holes in concrete ceiling for Ackerman anchors to hold electric wiring.

ROLLING SCAFFOLDS (below) facilitate installation of lighting fixtures by electricians. Entirely new lighting system had to be wired.

DUST FROM BALL MILLS and dry mixing units is drawn through exhaust ducts into Ruemelin dust collector.

PLANT CONVERSION proceeds smoothly under direction of these men: (Left to right) Maj. GEORGE S. DENITHORNE, C.E., resident engineer; CARL HOLDAMPF, assistant chief engineer, Klug & Smith Co.; ROBERT SCHOMANN, of Reinke & Schomann; and W. H. EMORY, JR., vice president, Klug & Smith Co.

TERRAZZO FLOOR FINISHERS driven by 5-hp. electric motors clean factory floor to be used for cafeteria.

three shifts on or before Sept. 1. An accompanying chart shows the general effect on employment of the shutdown and reconversion of the factory. Urgent need for dry-cell batteries by the Signal Corps led to the Feb. 1 decision to convert the plant.

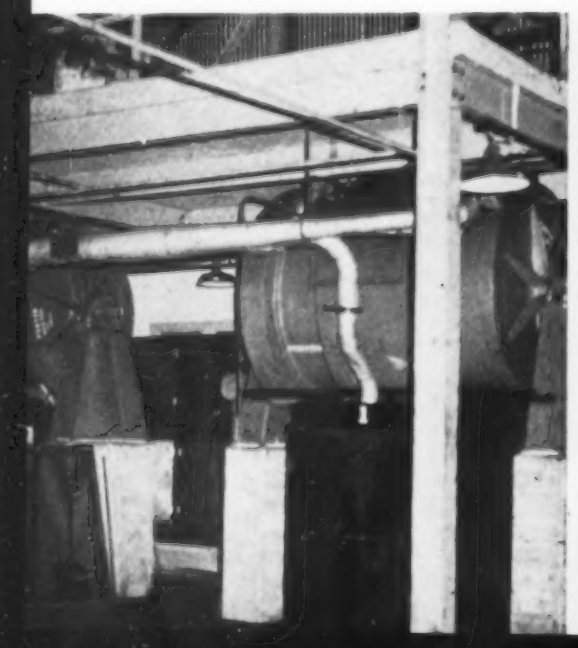
Machinery Removal

In clearing the floors of ammunition manufacturing equipment, the Lochen firm removed, processed, skidded and stored 827 machines weighing a total of about 3,500 tons. Some of these machines were loaded on railroad cars for shipment to other plants, but the majority were stored at the Milwaukee Ordnance Plant. Many of the latter machines, specially processed for weather protection, were placed in outdoor storage. The entire operation of removing, loading, processing and storing the equipment, including the removal of about 4 mi. of conveyors weighing nearly 250 tons, required about four months with an average force of 70 men at work.

Conversion of the floors to the new production processes started as soon as the area was cleared of the old machines. To conserve materials, the conversion contract required that the ventilating, electric power, lighting and piping systems of the ammunition factory be salvaged and reused to as great an extent as possible. Complete revamping of all these utility

(Continued on page 136)

HEAVIEST UNITS installed in battery factory are Porter ball mills. Mobile trolley chain hoist mounted on A-frames equipped with casters handles 5,000-lb. drums of these units. Two of six ball mills are shown in position on concrete pedestals.



SALVAGED PLYWOOD (below) is cut to size for re-use by Porter-Cable 8-in. electric saw in order to conserve materials.

WET MOP (below) serves to catch dust as Thor air drill cuts hole for kitchen line through concrete floor slab.

LEGAL ADVENTURES of TRACTOR CONN

By LESLIE JOBB

No contractor ever tries to be his own dentist or his own shoemaker. It is even more dangerous for him to be his own lawyer. There are, however, some legal rules which every contractor should know, and these rules may be explained in plain English without resorting to the jargon of the law, unintelligible to most laymen.

This series of articles, dealing with the Legal Adventures of Tractor Conn, a typical contractor anywhere in the United States, explains some of these legal points in plain language for the contractor. Each one is based on an actual decision of an American Court.

The Case of the Changed Acceptance

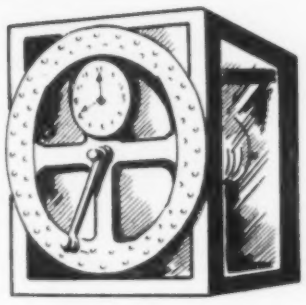
Tractor Conn not long ago found himself in the middle of an interesting situation. He ordered 600 tons of structural steel on a 60-day draft and the order was accepted. Then the seller wrote Conn to the following effect:

"On account of the stringency of the money market and the difficulty which we have in arranging for accommodation at our local bank, we are forced to cancel the order which you sent us recently. However, we are anxious to retain your business and will be pleased to ship the steel, if you will pay cash. As an extra inducement we will allow you a discount of 1 per cent on the agreed price."

"I'm not in a position to accept your offer, so if I have to buy the steel elsewhere on credit, I'm entitled to collect from you, by way of damages, the difference between your price and the price that I am compelled to pay," Conn argued. The parties went to court, Tractor Conn showed that he was not in a financial position to accept the cash offer, and the Court ruled in his favor.

"Another limitation on the rule is that it does not apply unless the buyer is able to accept the offer and pay cash. The essential justice of this restriction lies in the fact that many business men must operate on the capital of others. They must have a period of credit for the order within which they may make sales of it and use the proceeds toward liquidation. A buyer enters into a contract for his supplies, disclosing that he must have credit. What fairness could there be in a rule which would permit the seller at a late and critical date, when the buyer must have goods, to say: 'Pay cash. If you haven't it, use your credit and find it in the bank. We tender you the equivalent or better for the discount you will have to pay,' " said the Court in a case reported in 204 Southwestern Reporter, 204.

The Case of the Conditional Sale



"You can have that time clock for $300—6, 12 and 18 months," the salesman offered.

"I'll take it," Tractor Conn agreed.

"Of course there'll be the usual 'conditional sale' agreement that we take on all time sales, which provides that the title to the clock remains in us until full payment," the salesman suggested.

"No objection to that," Conn concurred and signed on the dotted line.

Two months later part of Conn's plant, including the time clock in question, went up in smoke through no fault nor negligence of his. When the first payment came due the seller demanded the money.

"That clock was yours till paid for, then it was to be mine. Now you've no clock to deliver, so I'm clear of my contract,"

"No, you're bound by the contract, regardless of the fire," the seller retorted, and won out.

"We are of the opinion that the true rule is that the loss must fall on the purchaser. The retention of title in the seller was a mere security for the payment of the price; and if the rule was otherwise, the buyer would have no incentive to take care of the property," says the Kansas Supreme Court in Marion vs Buchanan, which may be found in 12 A.C. 707.

The Case of the Option to Buy

Tractor Conn was negotiating for the purchase of a competing plant.

"I'm pretty sure I'll buy, but I don't want to tie myself up right now. What if you sell to somebody else before I make up my mind?" Conn demanded.

"I'll sign up a paper giving you an option to buy at the price we've agreed on at any time within the next three months," the anxious seller agreed. The option was signed, Conn took it across the street, and slapped it down on the insurance agent's desk.

"Can you insure the buildings on that property to protect me while the option's running?" Conn demanded.

The agent frankly admitted that he did not know.

The law on this point is clear. The American courts have ruled that the holder of an option to buy property at the actual market value has no insurable interest to protect, for if the property burns he may buy other property of the same value for the same money and has lost nothing by the fire. On the other hand, if the option is for less than the actual value, the holder may insure to the extent of any profit he might make by exercising his option.

More Legal Adventures of Tractor Conn Next Month

Construction AT

Standard American-Made Heavy-Duty Machines Aid Army Engineer Operations in France, England, Italy and South Pacific

ERECTION OF STEEL for frame of Army structure in England is done by Osgood crawler crane.

AMMUNITION DUMP for shells of a 240-mm. howitzer (below), used for first time in this war, is prepared with aid of Lorain truck-mounted crane equipped with clamshell bucket in Mignano area, Italy.

TO PRODUCE ROCK for road repair in area of France captured during invasion, U. S. Engineers operate Cedarapids portable-crushing plant (below).

...n Equipment ...T WAR

TO AN EXTENT never existing in any previous conflict, heavy-duty construction equipment is playing a part of primary importance in the present World War. Far from consisting mainly of light hand tools, the regular equipment of the Army's Engineer units in war theaters throughout the world today includes such standard machines as power shovels, crawler cranes, piledrivers, air compressors, tractors, motor trucks, scrapers, bulldozers, concrete mixers, road graders, road rollers, welding machines, rock crushers, and units of many other types, all commonly used in peacetime heavy construction. To the work that these machines are performing in combat areas is attributable no small share of the success that is marking the operations of the Allied Forces in Europe, in the South Pacific and in the Far East.

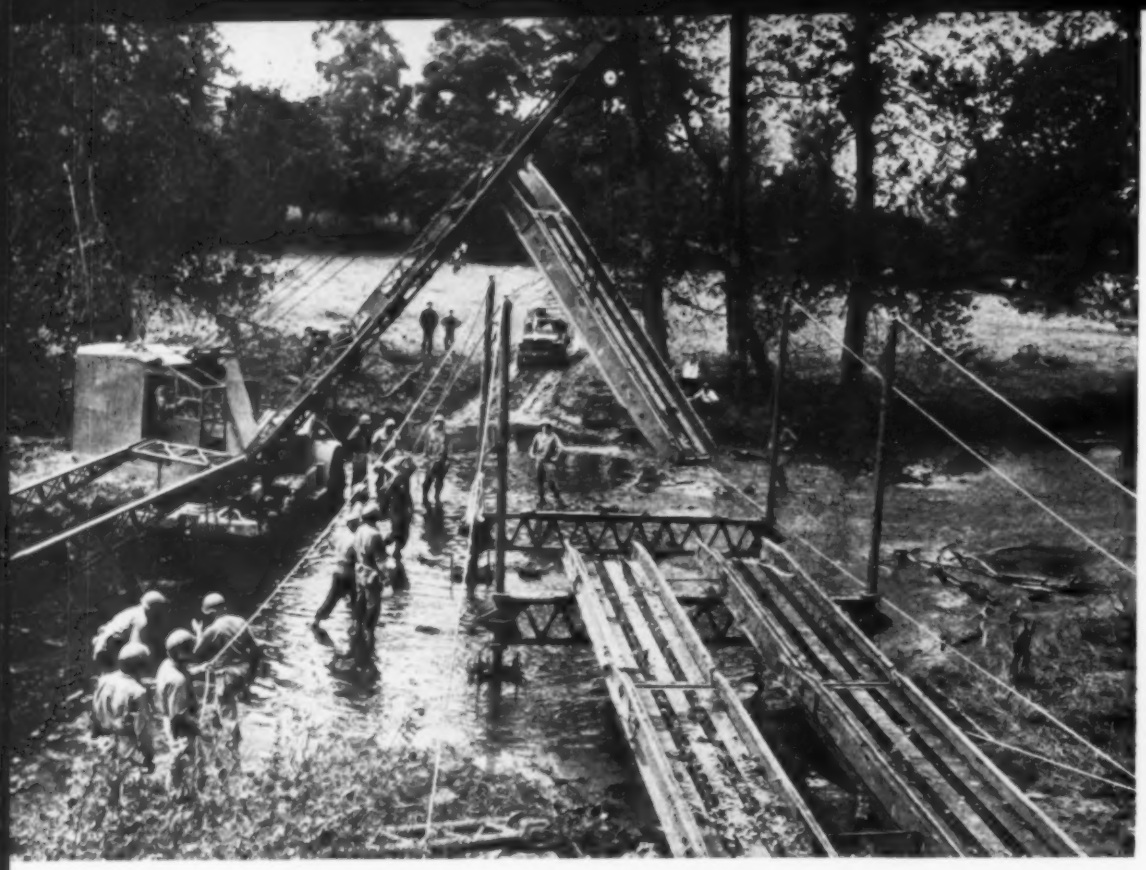
Visual evidence of what heavy-duty construction equipment is doing in various war theaters is offered in the accompanying selection of official U. S. Signal Corps photographs made available for publication in *Construction Methods* by the War Department.

WRECKED BRIDGES in Italy are repaired by Engineer units of American Fifth Army with aid of Buckeye crawler-mounted crane equipped with vertical leads for driving piles in Malta River.

HARD SURFACE of material for road building and airport construction in Egypt is broken up by Le Tourneau rooter hauled by Caterpiller tractor equipped with Le Tourneau angledozer.

Photos Signal Corps, U. S. Army

RUBBLE IN STREETS (below) of Travieres, France, left by aerial bombardment and shelling by Naval guns, is cleared by Caterpiller diesel tractor equipped with hydraulically operated La Plant-Choate bulldozer blade.



BRIDGE ACROSS VIRE RIVER in France is quickly built by First Army Engineers using Quick-Way crane to swing steel roadway sections into place on supports carried by steel trestle bents.

EARTH EXCAVATION at Army Engineer project somewhere in England is handled by clamshell bucket on boom of Buckeye crane.

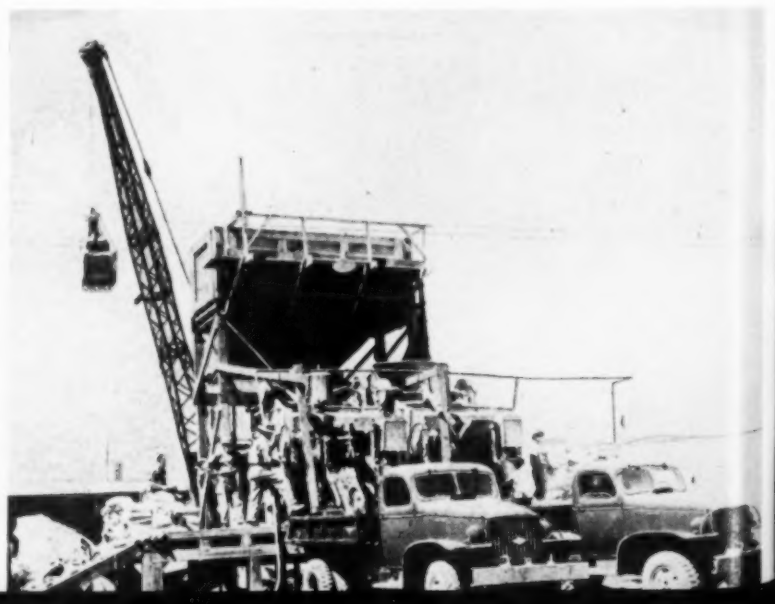
EXCAVATION FOR PIPELINE to serve newly built hospitals in Cherbourg peninsula of France is done with Barber-Greene trenching machine.

Page 72

TWO-LANE HIGHWAY (below) providing access to Munda airport in New Georgia is graded by Galion motorized blade grader.

AT DAM SITE near U. S. Army camp in Australia, Cletrac tractor with Buckeye bulldozer moves earth.

ON DOCK CONSTRUCTION in New Caledonia concrete batching and mixing plant (below) is equipped with Jaeger mixers. Material is handled into overhead bins by Lima crawler crane.



...Equipment AT WAR

... Continued

SAND STOCK PILE in England is worked by ½-yd. Osgood crane with clamshell bucket. Tractor-bulldozer just visible atop pile aids operation of U. S. Army Engineers in building airdrome.

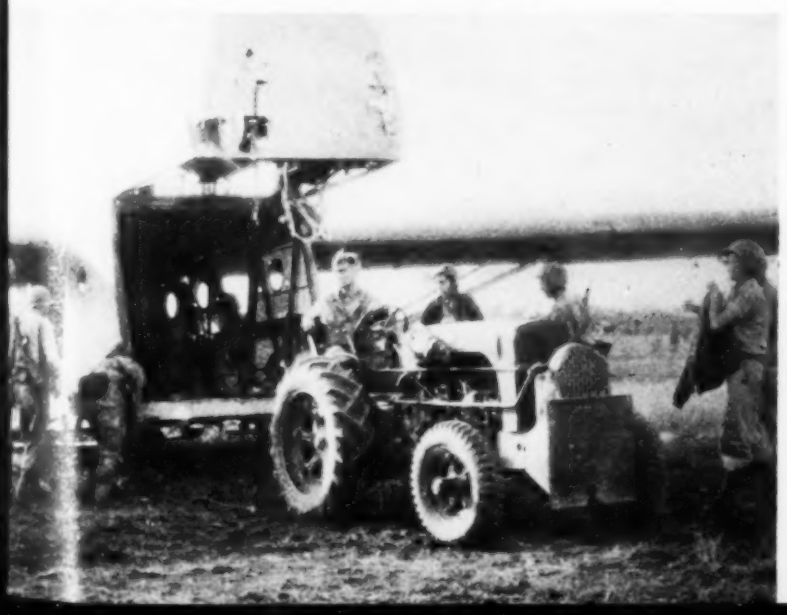
FOR AIRFIELD CONSTRUCTION in England a Blaw-Knox batching plant is set up and served by a ¾-yd. Lima crane.

Photos, Signal Corps, U. S. Army

PILE DRIVING for bridge crossing Milne Bay in New Guinea is done by Koehring crawler crane equipped with vertical leads.

GRAVEL PIT for supplying material to surface road in New Guinea is worked by ½-yd. Bucyrus-Erie power shovel mounted on crawler tractors.

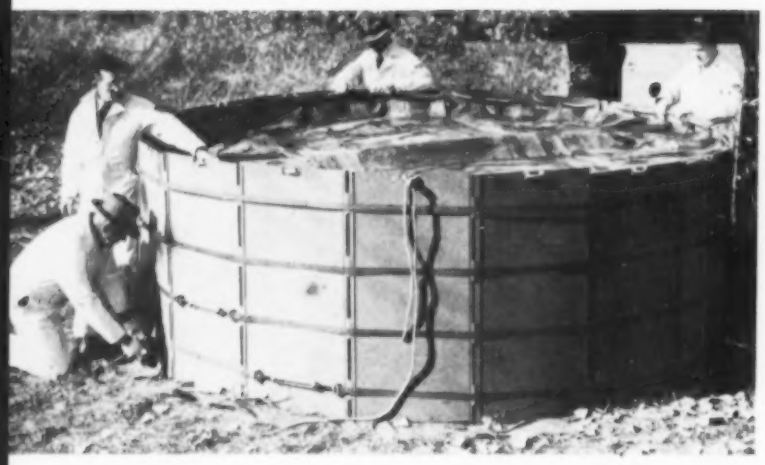
HAULAGE OF GLIDER from Myitkyina airfield, in Burma, is done by four-wheeled, rubber-tired, gasoline-driven J. I. Case tractor.



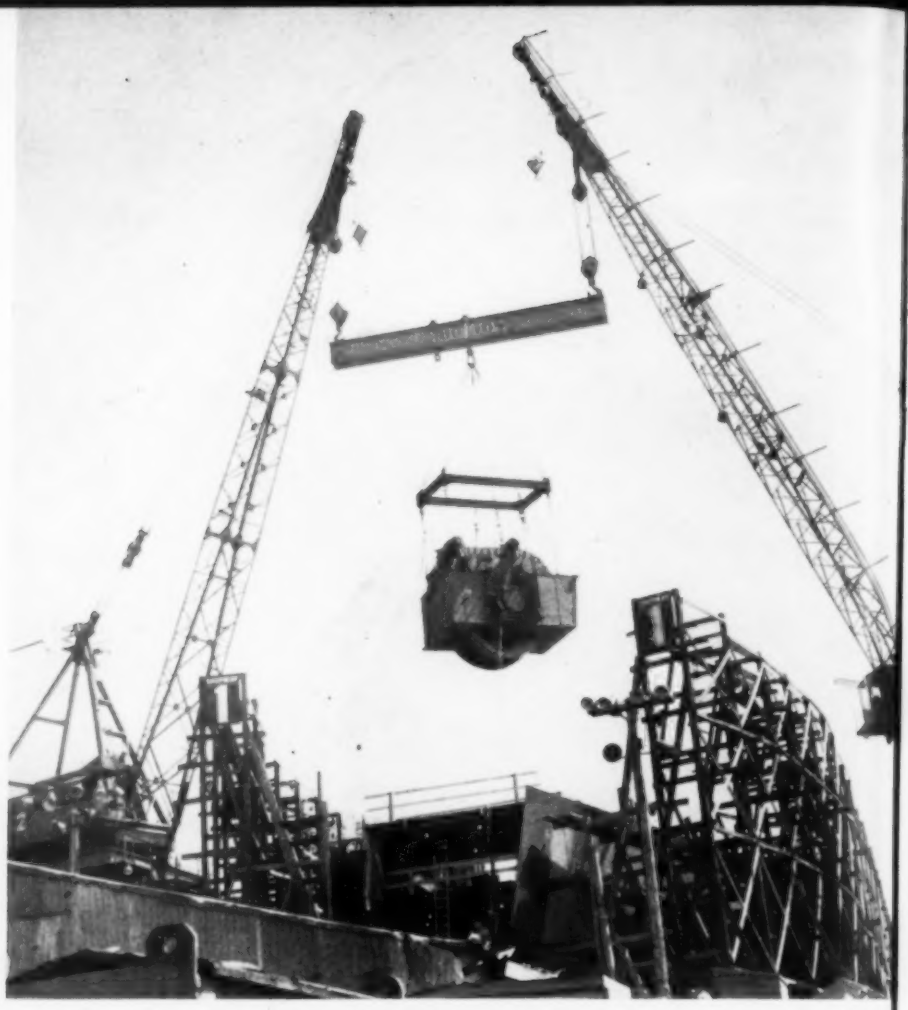
FROM CORAL PIT (below) in New Hebrides area, ¾-yd. Northwest power shovel removes material for surfacing roads and airfield strips.

HOW They Did It

CONSTRUCTION DETAILS
For Superintendents and Foremen



PORTABLE SYNTHETIC RUBBER TANK, now extensively used in combat areas for storage of gasoline, oil and aromatic fuels, is set up near Mishawaka, Ind., plant of United States Rubber Co. Collapsible and light in weight, tanks can be shipped in small space, can be easily camouflaged in field and set up and knocked down quickly for transportation to new location.



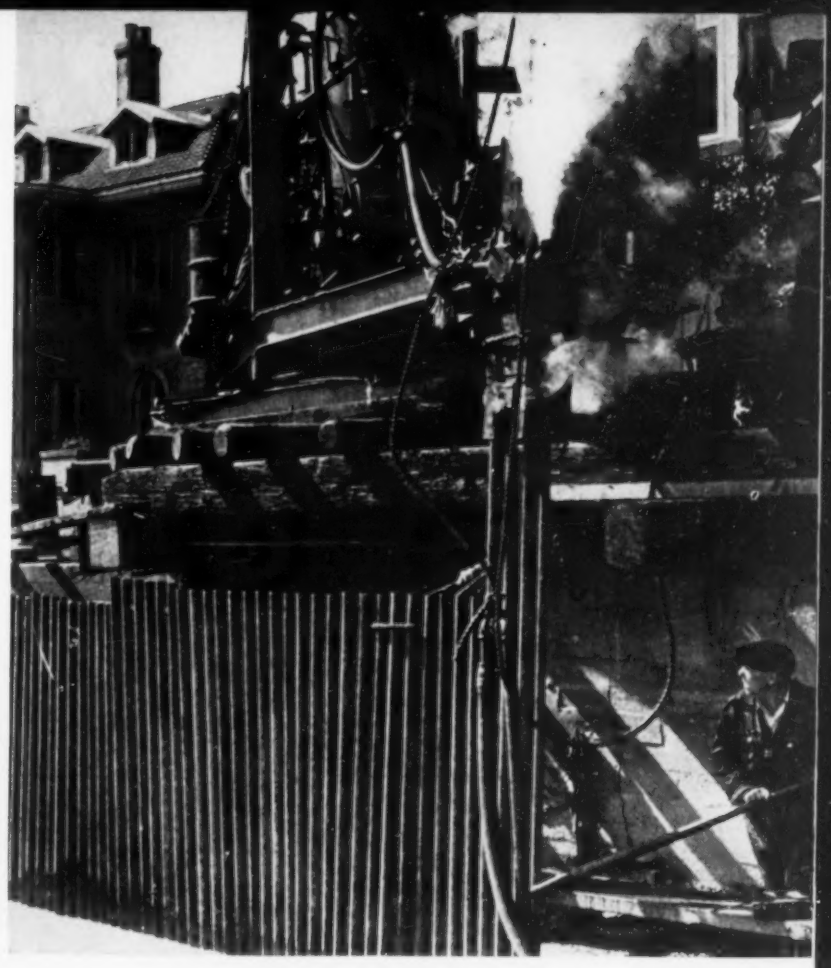
PREASSEMBLED 75-TON BULK of Westinghouse turbine reduction gears is lowered into Victory ship hull in one piece at Richmond, Calif., yards of Permanente Metals Corp. Former custom was to make five crane lifts to land bull gears, pinion gears and cap. After assembly, lift was made in 15 min.

JACK TESTS STATIC LOAD (left) or overload on anchor windlass and other shafts to save many man-hours in ship production at Ingalls Shipbuilding Corp., of Pascagoula, Miss. Devised by C. A. HAMILTON (left) of Test Department, it makes possible measurement of actual strain applied in static loads by use of pressure gage in one-fourth time previously necessary. U. S. Navy Photo

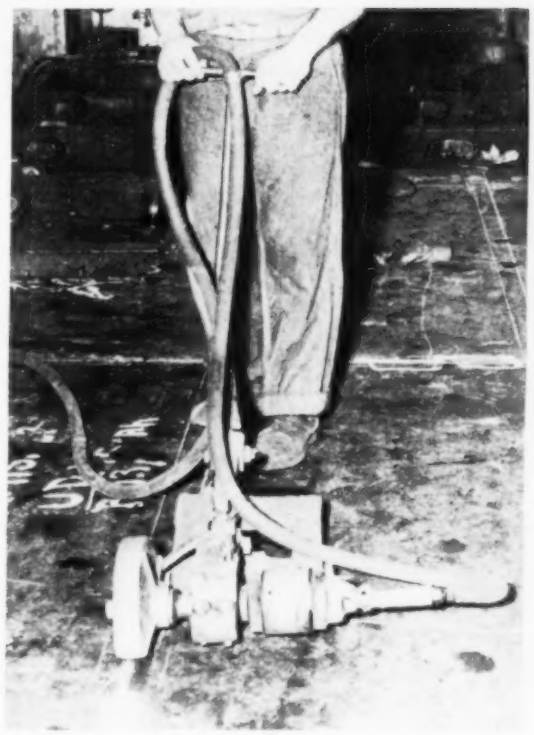
NEW TYPE VIBRATOR (right) helps speed concrete laying operations on landing strip being constructed by Consolidated-Vultee Aircraft Co. at Lindbergh Field, San Diego, Calif. Strip is 8,500 ft. long and 200 ft. wide, of concrete 12 in. thick, and is designed for wheel loads up to 85,000 lb. per wheel. Freshly poured concrete is consolidated by internal vibration with newly designed equipment consisting of screed carrying eight Viber units. It is being laid in 25-ft. sections. Mechanized concrete laying made it possible to schedule this $2,500,000 job for completion in record time of 150 days. Contractors are Casson & Ball, of Hayward and Berkeley, Calif.

BEARING TESTS (left) by U.S. Engineers measure supporting capacity of subgrade soil for airfield paving at Stewart Field, Newburgh, N.Y. Hydraulic jack under I-beam between two loaded trucks applies pressure to circular steel plate, while two Ames dials connected to fixed horizontal steel angle measure settlement of plate into soil.

TRACTOR-MOUNTED POWER SAW, devised by J. C. Jaques, contractor, of Austin, Tex., proves effective in clearing trees and brush from reservoir area with reduced labor force. Rigged in horizontal position on adjustable, hydraulically controlled arm extending from tractor frame, circular blade, rotated by fluid drive, fells timber up to 4 or 5 in. in diameter while tractor is in motion and cuts larger trees in stationary position. Saw blade diameters of 48 and 60 in. are used.



FOR PROTECTION against turbulent lake waters that have undermined concrete walls and caused frequent cave-ins along Chicago's lake front, light corrugated steel piling furnishes buttress wall for 350-ft. length. Clip lock sections 12-in. in width of 8-gage steel and weighing 11.74 lb. per sq. ft. were driven to depth of 15 ft., allowing 5 ft. of freeboard. Steam piledriver weighing 15 tons, able to swing in any direction, was provided with No. 3 McKiernan-Terry hammer. Rig operating on rollers on platform of heavy timber, constructed along old concrete shore wall, drove piles straight to full penetration. Angle-iron 6 in. wide, welded along back of piling with T-sections spaced every 15 ft., made firm, stiff wall. Space of 4 ft. left between old concrete and steel piling was filled with heavy rubble. Contractors were Walsh & Masterson, of Chicago, and Caine Steel Co., furnished corrugated steel piling.



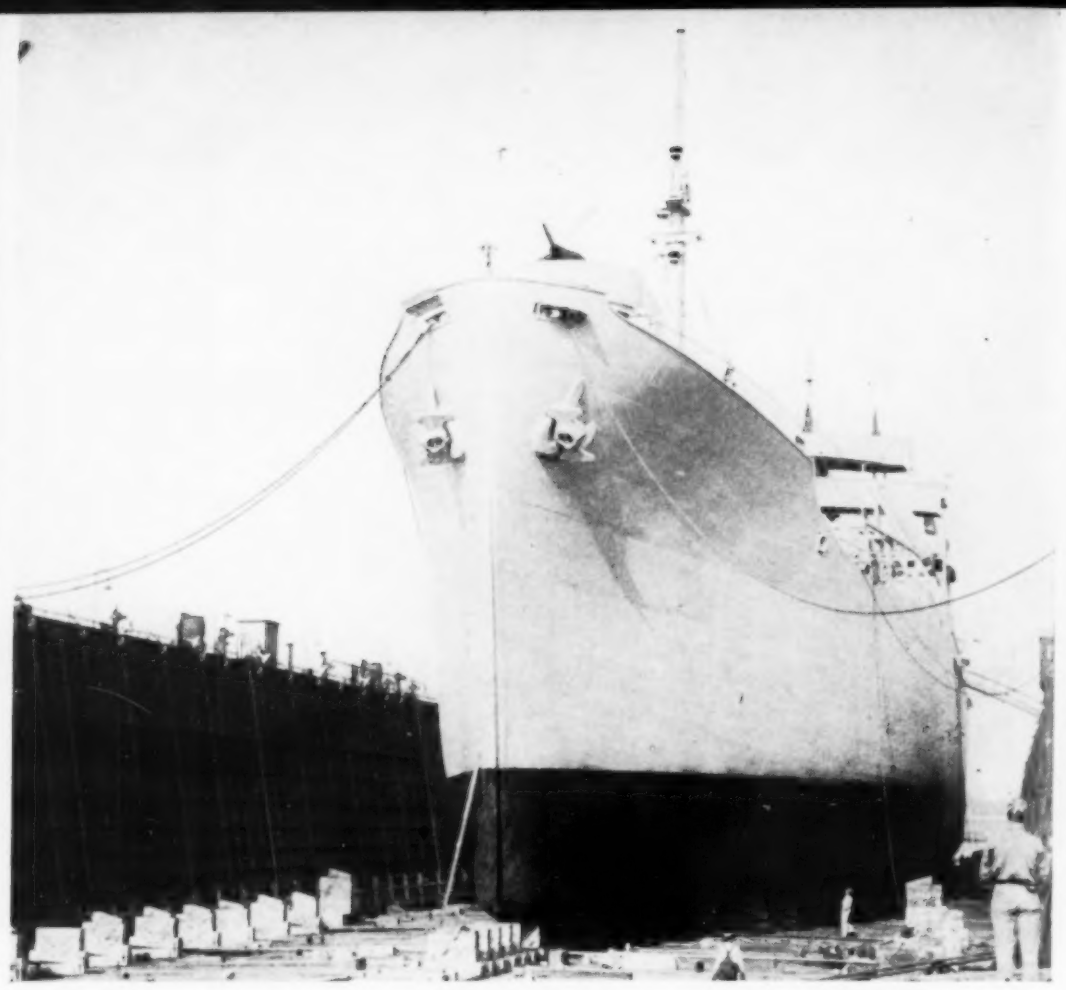
PORTABLE GRINDER (right) operated by compressed air is used for flat work in and about automatic welding tables at Sun Shipbuilding & Dry Dock Co., of Chester, Pa. Developed by William Brientnall, tool room foreman, it keeps worker off cold or hot steel, removes possibility of emery getting in his eyes and reduces fatigue.

U. S. Maritime Commission Photo

ARMY DRYDOCK (below) repairs landing and cargo barges battered by Alaskan seas. Constructed of heavy timber and 6-in. pipe, this temporary marineway is built close to shore by U.S. Army Engineers. With aid of high tides, boats can be easily floated and rolled up for repair.

Step-by-Step Field Methods

How All-Welded Steel Tankers Are Built and Side-Launched



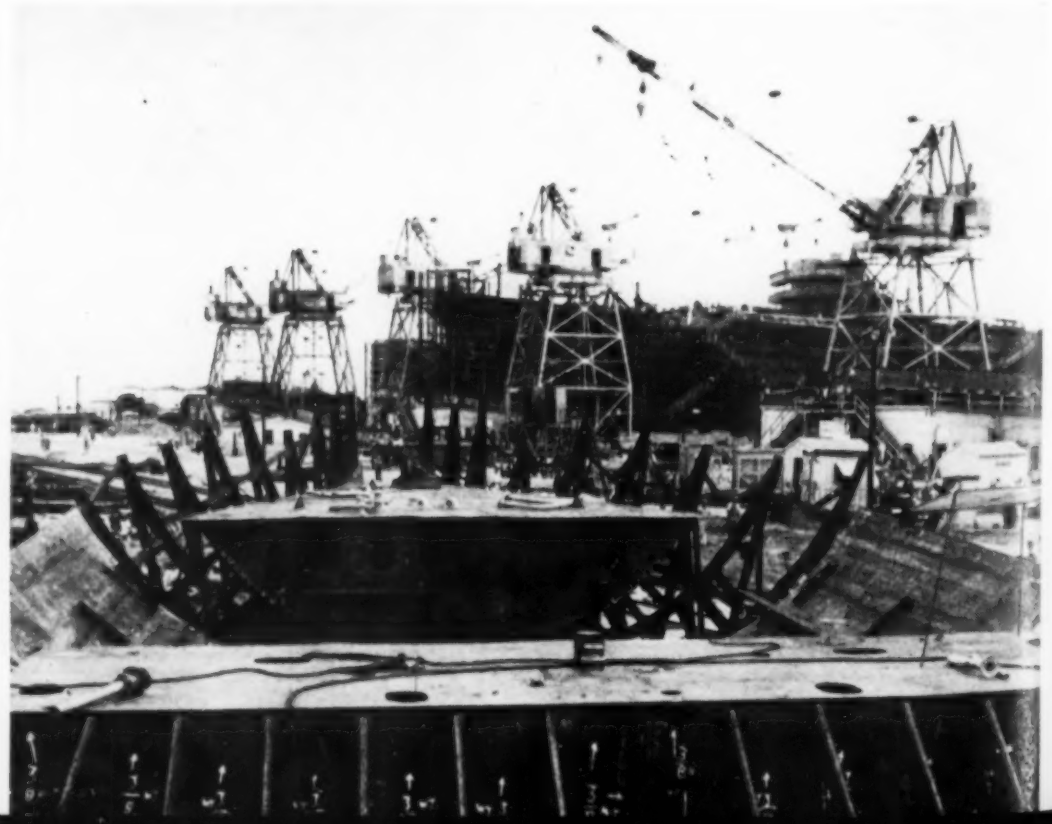
COMPLETED TANKER in drydock, is 22,800-ton all-welded steel hull 523½ ft. long with oil-carrying capacity of 141,000 bbl.

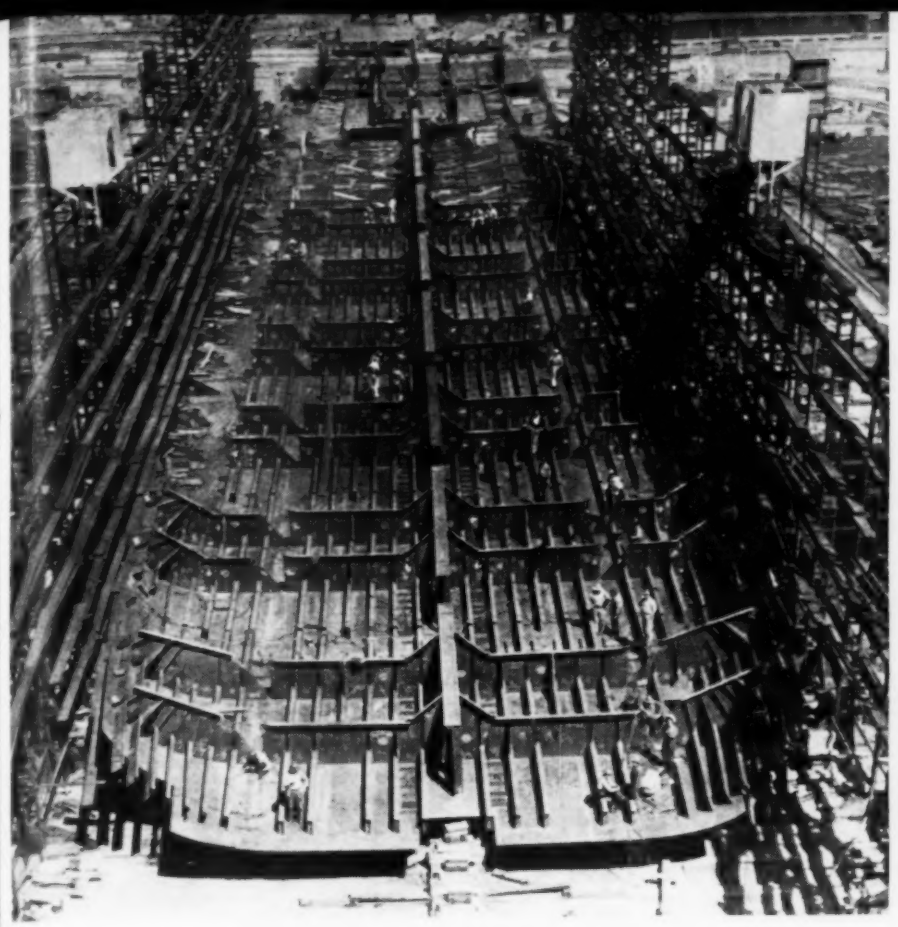
CONSTRUCTION PERSONNEL AND METHOD are playing an important role in the construction of vitally needed tankers, as two New York construction firms, Spencer, White & Prentis, Inc., and Turner Construction Co. are associated with the Alabama Dry Dock and Shipbuilding Co., Mobile, Ala., in the building of 22,800-ton all-welded steel tankers for the United States Maritime Commission.

These vessels are 523 ft. 6 in. long, have a capacity of 141,000 bbl. of oil and are powered with 6,000-hp. turbo-electric drive connected to a single propeller. These tankers are being built in a new 300-acre yard at Mobile especially constructed for the purpose. The yard consists of 10 ways, eight of which are used

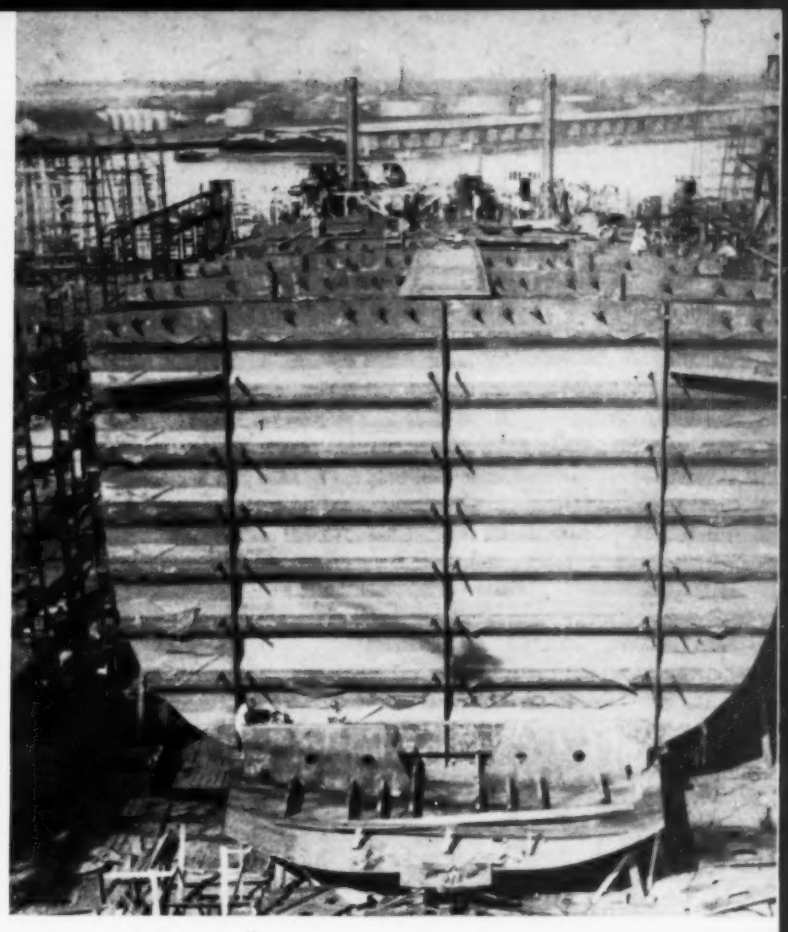
1 SUBASSEMBLY METHODS (below) are used to produce 21-ton prefabricated bow of tanker.

2 PREFABRICATED SECTION (below) of engine room has double bottom. These weldments are most difficult to construct and are completed prior to keel-laying so that completed engine room work can be started as soon as possible.





LOOKING FORWARD, keel, bottom shell and bilges are shown on ways. Note bulkheads being assembled at extreme end of ways.



TRANSVERSE BULKHEADS and center section of hull are shown, looking aft. Bulkhead strength is derived from horizontal corrugations.

for end launchings and two for side launchings. To outfit the tankers, four piers have been provided with berthing space for eleven tankers.

Each way is served by two 50-ton gantry cranes and transportation of material is mainly by rail, with truck transportation for small items. There are 20 mi. of railroad track in the yard to provide for this transportation of materials.

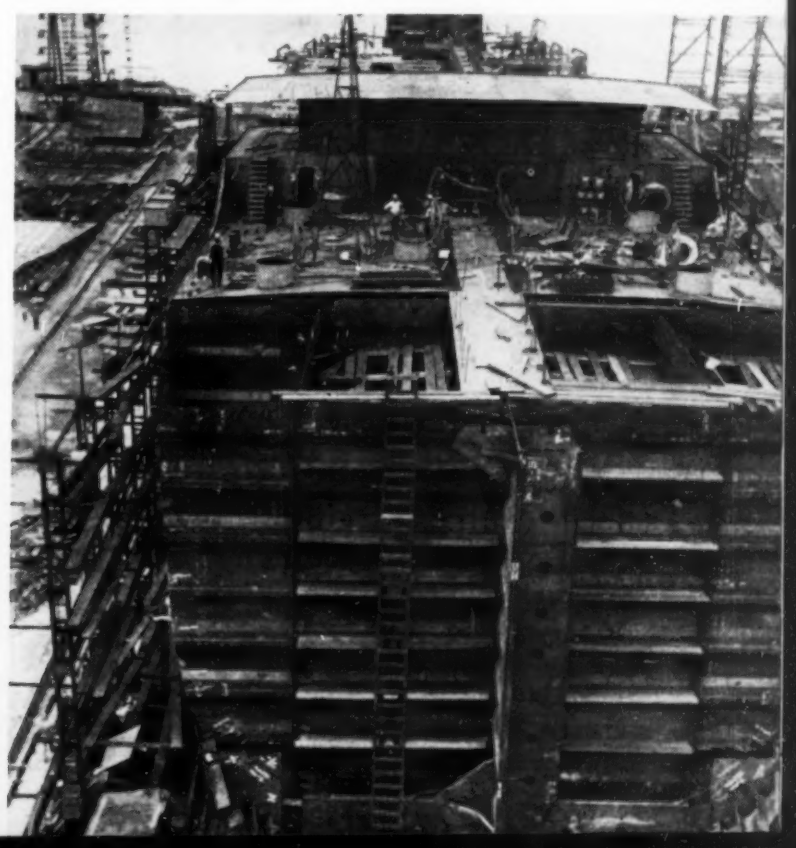
One distinctive feature of the yard is the fact that the ways are 317 ft. apart with a clear space of 170 ft. between the ways. This area is advantageous for storage and construction of bulky and heavy sections of the ships which are not easily transported.

Prefabrication of steel is used as much as possible. In the platen areas, the welded sections of the ships are built in as large sections as can be transported and hung on ships.

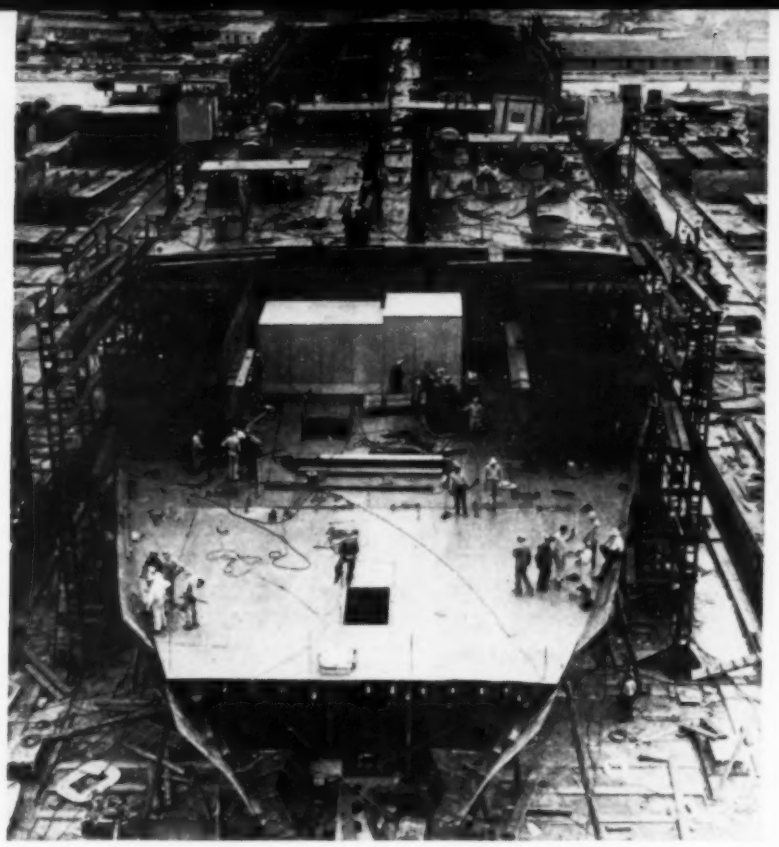
An excellent measure of the amount of preassembly work is that out of a total of 352,000 lin. ft. of welding per ship approximately 70 per cent, or 250,000 lin. ft., is done on the platen area or subcon-

5 GANTRY CRANES (below) lift 75-ton midship bridge deck to position.

6 BULKHEADS, MAIN DECK AND DECK-HOUSES (below) are installed. Clearly visible in this view looking aft is make-up of tanks of ship, with large center tank and two wing tanks.



7 **94-TON FORWARD COFFERDAM and pump room are erected complete with machinery and piping. This unit is assembled on ways and is heaviest unit to be erected.**

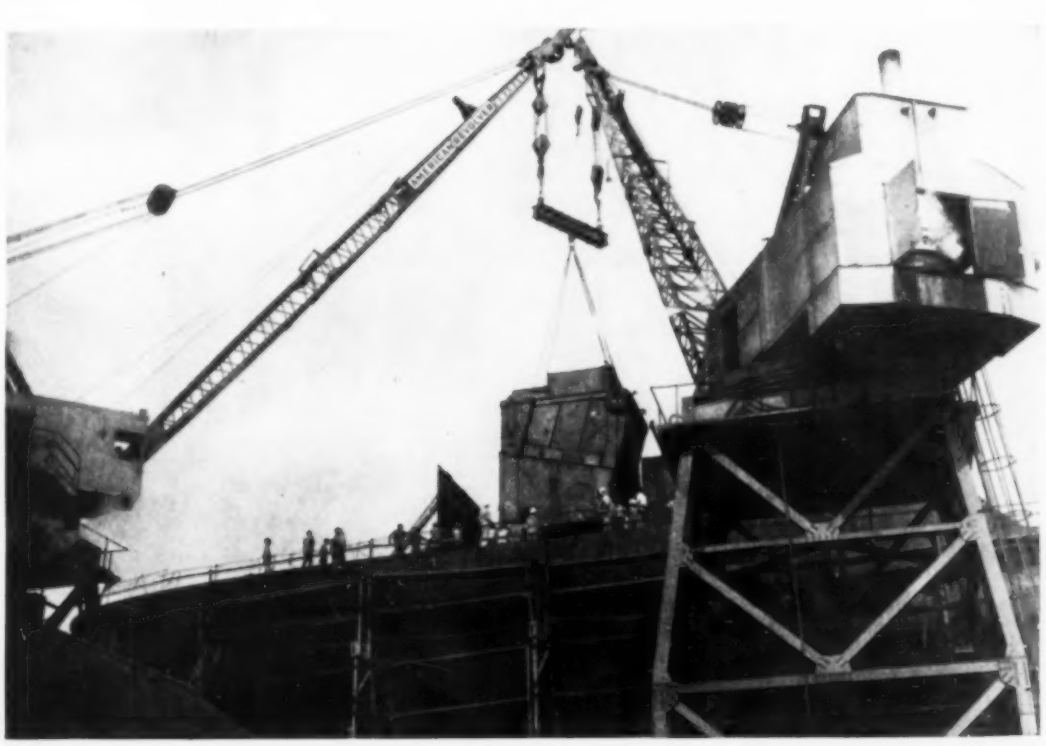


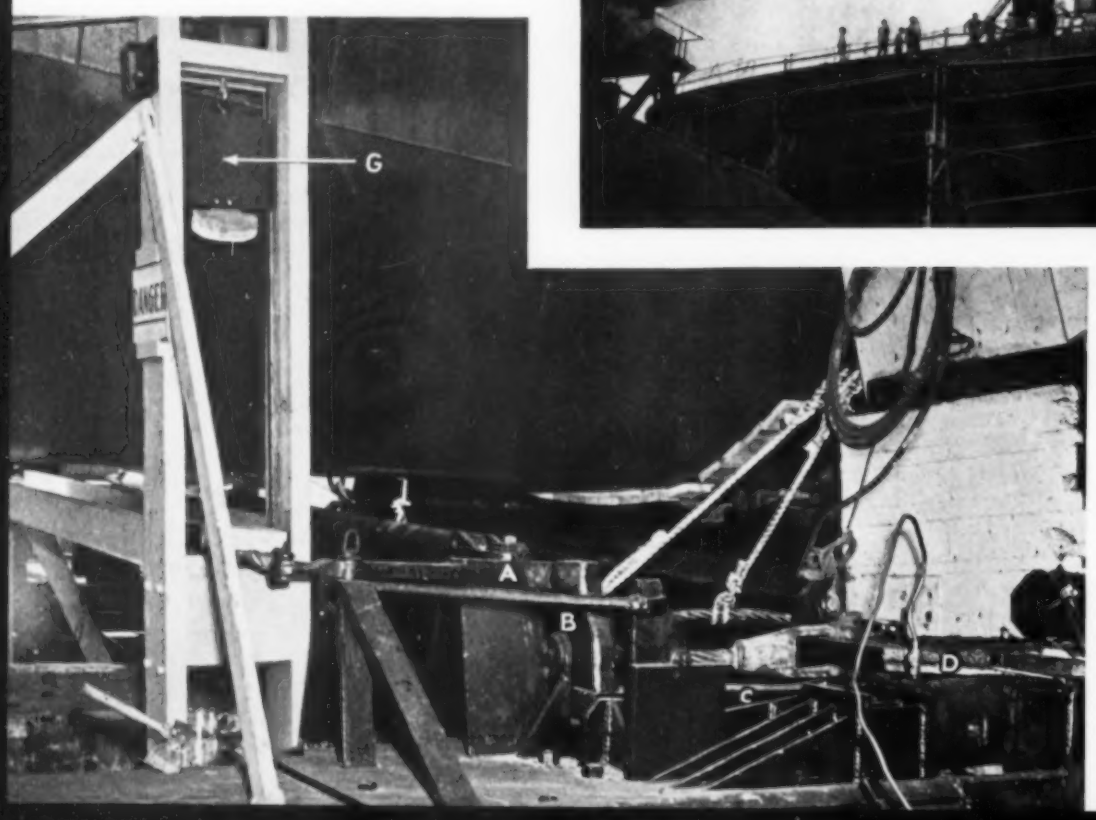
8 **ENGINE ROOM just prior to machinery installation is shown in this view looking forward. Note portable arrangement of welding machines grouped in units of six and protected by roofs.**

tracted. About 17 per cent, or 60,000 lin. ft., per ship is automatically welded. Thus only 30 per cent of the welding is actually done on the ways.

In line with this policy, a large quantity of the pipe is also prefabricated. To figure out the complicated bends in the engine room, it was decided to build a full scale model of the stern of the tanker. This was done by erecting the steel for a tanker on a concrete base which conformed with the floor of the engine room. Models of the machinery were placed in this mock-up and the exact layout of the piping was then determined. From this

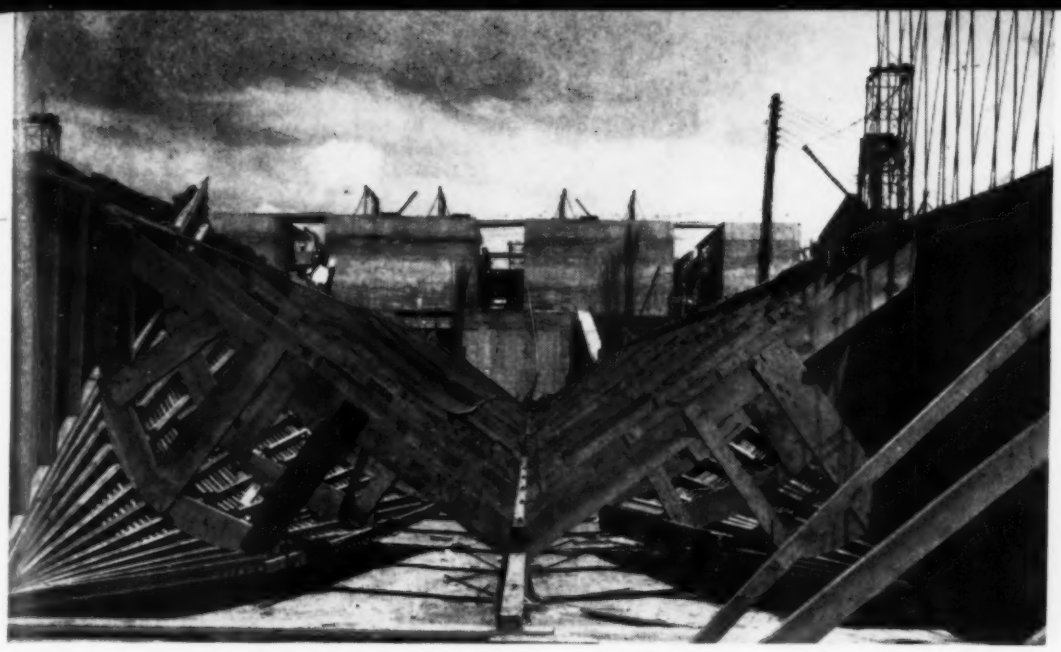
(Continued on page 104)



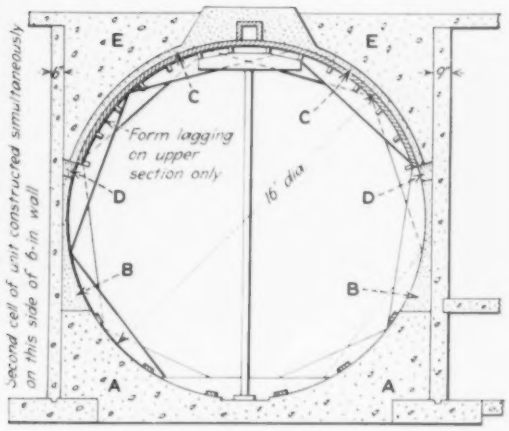


9 **67-TON BOILER is lifted into position on ship. This boiler is completely assembled and tested prior to erection, even fire brick is installed.**

10 **LAUNCHING GEAR (left) includes "guillotine" (G) at left, which cuts manila rope releasing horizontal lever (A) which releases vertical levers (B) and horizontal lever (C). Lever has jaw on end holding back sliding ways (D) until levers are tripped. Hydraulic jack at right is used in case ways should stick. This has happened only once. Heavy socket and wire rope attached to running ways are connected to snubbers on ways and pull skids from under tanker when it hits water.**



TRANSITION SECTION (left) connecting circular test cell with rectangular chamber requires special forms, two of which are shown here in position for concreting lower third of cell.



SEQUENCE OF OPERATIONS in constructing 16-ft.-dia. cell calls for these steps: (1) Place dry concrete for section A; (2) erect forms; (3) Gunite section B from inside; (4) Gunite section C from above; (5) Gunite section D from inside; (6) place concrete in section E. Slot at Section D is left open temporarily to dispose of material which may collect in upper portion during Guniting of section C.

Larger Diameter Test Cells

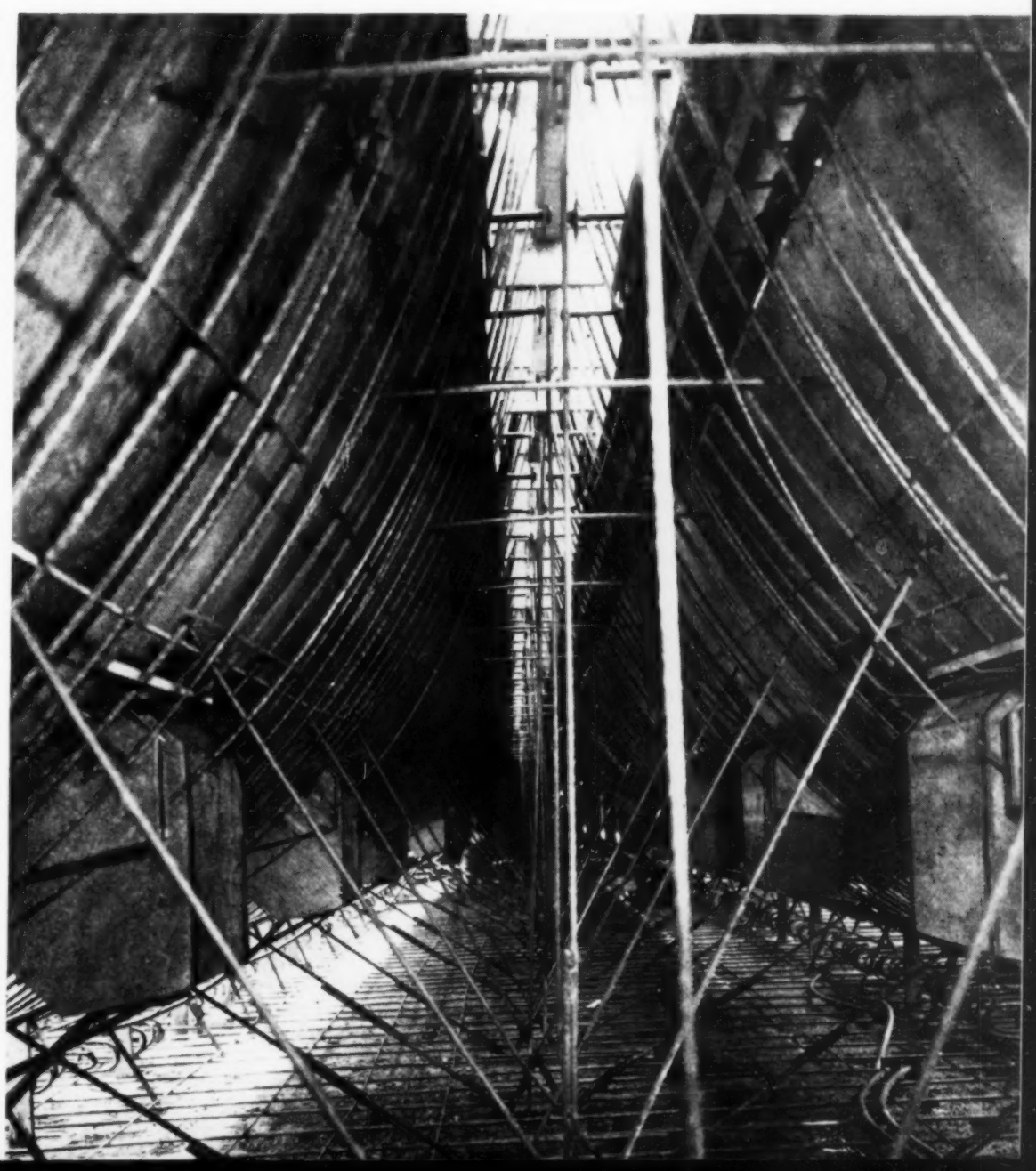
Concreted to ¼-in. Tolerance

FORMING AND CONCRETING METHODS designed to assure accurate construction of reinforced-concrete test cells 16 ft. and 24 ft. in diameter at the Pratt & Whitney aircraft engine plant, Kansas City, Mo., enabled Long-Turner, contractor, to complete the circular cells within the close tolerance of ¼ in. allowed by specifications. The concrete cells were built up in successive lifts from the bottom to the top, with horizontal construction joints between the sections. Construction involved placement of 1,232 to 2,700 cu.yd. of concrete in units consisting of two test cells and one control room observation gallery per unit.

Different methods were employed for the two sizes of cells. As the first step in constructing the 16-ft.-dia. unit, vertical reinforced-concrete walls were built at the two sides of each cell, using slip forms to conserve lumber and obtain maximum progress with least use of limited working space. These walls were 9 in. and 6 in. thick, as indicated by an accompanying drawing.

To start the test cell itself, dry-mixed concrete was placed for the bottom lift, comprising about one-fourth of the circular section, and the invert was shaped to the 16-ft. diameter by use of a template. On the completed invert, the constructors erected built-up wooden rings which were lagged only on the upper

(Continued on page 154)



FORMS FOR LOWER THIRD (right) of two 24-ft.-dia. test cells are tied down by anchor rods to concrete pads previously placed. Each test cell construction unit comprises two cells and a control room observation gallery.

The Economic Reconstruction of Europe

THE time is fast approaching when allied and enemy populations alike will demand a blueprint for the economic reconstruction of Europe. The peace plans following this World War will be written piecemeal, and by experts, at a series of continuing conferences, such as Hot Springs, Bretton Woods, Dumbarton Oaks and Quebec, each tracing a new pattern for negotiation and each dealing with a single, specific problem. In the drawing of these plans, the United States, as owner of more than half of the world's industrial capacity, controller of the only great credit reservoir, and possessor of the largest force of highly skilled technicians and management engineers, has heavy responsibilities which its industrial, financial, agricultural and labor leaders cannot evade.

☆ ☆ ☆

Just what is the problem which the world's business leaders must help solve in Europe?

The best safeguard of peace is economic opportunity — a good chance for all peoples to raise their standard of living by their own ingenuity, foresight and industry.

Frustrated and disappointed peoples, who view the future with misgiving rather than hope, breed fanatical demagogues who seek to divert nations from their ills and disappointments by promising military glory and conquests.

Consequently, an important step in building a secure and lasting peace is to open the doors of opportunity to the peoples of Europe.

The greatest obstacle to opportunity in Europe has been economic nationalism.

The economic tradition of the Continent always has been highly nationalistic. The national feeling generated by the first World War, and the political autonomy conferred upon many peoples by the peace treaties, led to a great growth of economic restrictions. This trend was accentuated by the depression and by the military plans of the Fascists and Nazis. Hitler had to show his people they could be fed even if a blockade was imposed again. The inevitable result of these influences was to carry self-sufficiency to tragic extremes.

Economic nationalism holds down the standard of living of Europe in two ways:

1. It prevents the rise in most European countries of low-cost mass production.
2. It operates against an efficient geographical division of labor, preventing nations from doing what each can do best.

Great machines require great markets. One great machine of which the United States has many and Europe few is the continuous strip steel mill. At the outbreak of the war we had twenty-eight such mills of various sizes, England but one, and Continental Europe one. A building containing one of these machines is more than a quarter of a mile long and the minimum cost of the mill is almost $25,000,000. Only the prospect of a mass market justifies production on this vast, but highly economic basis.

The wasteful geographical distribution of production is shown by the agricultural policies of Italy, France and Germany.

In the 1930's, when lard sold for less than 8¢ a lb. in the United States, it cost 32¢ a lb. in Germany. In Italy and Germany imports of wheat were banned and its production at home was heavily subsidized. By the middle of the 1930's, wheat sold for $1.55 a bushel in France, $1.97 in Czechoslovakia, $2.29 in Germany, and $2.47 in Italy. At the same time the United States and the other efficient world producers and exporters (Canada, Australia and Argentina) were *restricting* production and were unable to average more than about 75¢ a bushel for their wheat.

Economic unity in Europe must ultimately mean a freedom to trade not greatly different from what we have within the United States. Given economic unity and the large markets which go with it, efficient mass production will develop. With Europe receiving cheap supplies of such staple foods as wheat, pork, lard and dried fruits from overseas, European farmers can prosper by specializing in producing fresh foods — butter, cheese, eggs, fruits, vegetables.

Then European agriculture will be more prosperous producing its specialties, and our agriculture (and that of the other great efficient surplus-producing countries as well) will have greatly expanded markets for our staples.

With a cheaper food supply for Europe — yet one yielding a better price for our agriculture — European labor will live better. Labor now used uneconomically for agricultural production will be released for industry. With big machines and semi-automatic processes European labor can produce more steel, automobiles, furnaces, plumbing and electrical appliances to advance its standard of living in coming decades, as the United States has done in past decades.

A rising standard of living in Europe will bring

Europeans to view peace with optimism and hope. And world trade grows as confidence and prosperity widen.

☆ ☆ ☆

How would a Europe which possesses economic unity appear to us on this side of the Atlantic?

It would be a prosperous Europe that would have strength in its advancing industries, but as the single great agricultural deficit area of the world, it would be dependent upon overseas supplies for vital agricultural staples. This dependence upon overseas agricultural supplies would be greatest for industrial Germany. Some people believe that a strong Europe would be a threat to world peace. More important, however, is the fact that a strong and prosperous Europe would not be a frustrated Europe. It would have found a way to achieve a rising standard of living. Furthermore, a prosperous Europe would, economically, be a dependent Europe because, although the European industrial worker would use more and cheaper food, he would have it only as long as he maintained the peace.

A prosperous Europe would be of special advantage to American agriculture (if we do not keep on pricing ourselves out of the market) and of great advantage to American industry.

The British policy of buying agricultural staples from abroad, for example, made her, a nation of only 45,000,000, the purchaser, in 1937, of $250,000,000 of all kinds of agricultural products from the United States. In the same year the rest of Europe (exclusive of Russia), with a population of 325,000,000 purchased only $300,000,000 of our agricultural products. But with more sensible organization of its agriculture, Europe could be expected to buy more than one billion dollars of agricultural products from us.

By far the greatest market for an expanded European industry will be Europe itself.

For American industry, there will be growing markets in Europe as industry expands. Experience shows that the trade between different highly industrialized areas is large. This country's biggest export markets have been with its keenest competitors—Britain, Canada, Japan, France and Germany.

Before the war, Europe, with two and one-half times the population of the United States, had only one-sixth as many automobiles.

If Europe (exclusive of Britain and Russia) were to motorize proportionately, it would need 75,000,000 automobiles. With normal depreciation this would ultimately mean 10,000,000 cars to be produced annually to replace worn out cars.

If one still wonders about the immense number of things Europe might produce *for herself*, let him calculate the highway expenditures, the filling and repair station businesses that must be equipped and maintained; and the doubling of the steel production that would be required to make the automobiles themselves and to reinforce with steel even a moderate amount of additional concrete highways.

Another example is the electrification of Europe. With two and one-half times our population Europe's consumption of electrical energy would be 175 million electrical H.P., if the European worker were to have the advantage of as many H.P. as the American. Yet, just prior to the war, Europe's installed operating capacity was only about 40 per cent of this figure.

☆ ☆ ☆

What has been sketched for Europe is actually much more nearly a page from the economic history of the United States than it is mere prophecy about a desirable future for a Europe at peace. But how can it be achieved? And what is our part to be in helping to bring it about?

Economic unity can be provided for the sovereign states of Western Europe by the peace treaty or treaties adopted at the end of the war. The provisions for securing *economic unity* in Europe should specifically cover:

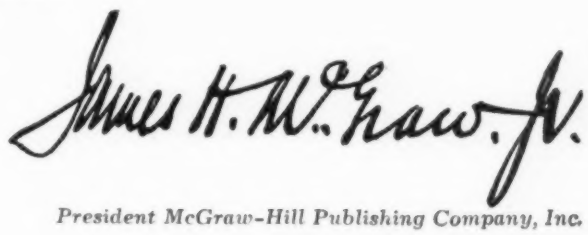
1. Substantial freedom for persons and enterprises to do business anywhere in Europe.
2. Reasonably free movement throughout Europe of persons for employment, recreation and education.
3. Greatly increased freedom of trade:
   a. Within Europe—through the application of a Europe-wide agreement reducing the tariffs among all European countries to a maximum of 10 or 15 per cent.
   b. With the rest of the world—through reduction of European tariffs on goods bought from overseas. This would call for generally lower levels on manufactured goods, and for the removal (after a reasonable period of progressive reduction) of tariffs on all agricultural foodstuffs and most industrial raw materials.
4. A special currency provision requiring as nearly as practicable complete currency stabilization for all countries of Western Europe among each other.
5. Creation of an agency (with adequate revenues) through which all Europe-wide business and other affairs affected by these agreements would be administered for a minimum period of twenty-five years.

This would permit the economic unity of Europe to be substantially achieved. During this period, assistance in administering the provisions would be given by officials of the United Nations.

Near the end of such a period arrangements could be made for a vote in the European countries on whether or not to continue the "unification provisions." If the vote were in the negative, the United Nations would have proper warning that additional safeguards would be necessary to prevent war.

The suggestions made in this statement aim at securing economic unification of Europe and thereby promoting the possibilities of permanent peace in Europe.

The realization of these possibilities throughout the postwar years requires a freely expressed public opinion in Europe to guide all who share the responsibility for bringing peace to Europe and to the world.



President McGraw-Hill Publishing Company, Inc.

HOISTING POLES RAISE ARCHES OF

Packaged Steel Hangar

LEANING GIN POLES at quarter points assist in raising arch rib hinged at both ends to base plates. Center lifting line is run through sheave suspended at top of previously erected arch.

DEVELOPED ORIGINALLY to conserve steel and other critical war materials, a light-weight all-steel arch hangar designed by the American Rolling Mill Co. at the request of U. S. Engineers utilizes pressed channel shapes of stock types in a bolted construction which possesses advantages of demountability, shipment in small space and ready erection with simple equipment. One such portable hangar, first put up at Camp Springs, Md., has been dismantled and re-erected in Florida for the Army Air Forces. Erection of a second for use of the Air Transport Command has been completed at the Washington National Airport by the construction division of Armco Drainage & Metal Products, Inc., Middletown, Ohio.

ARCH RIB, made up of bolted segments like those in foreground, is raised into vertical position with aid of two 40-ft. leaning gin poles at Washington National Airport. Demountable hangar nearly 200 ft. long comprises eleven bays roofed with pressed channel-shaped steel panels bolted to flanges of upper chords of arch ribs. Ventilating monitor is mounted on top of roof.

Made up of eleven bays 17 ft. 4½ in. in length, the Washington hangar has an overall length of nearly 200 ft. and a clear inside span of 160 ft. at 15-ft. elevation. The maximum clear inside height to lower chords of arch ribs is 48 ft.

Structurally, the building consists of latticed arch ribs, with light-weight steel channels for the upper and lower chords, and a rigid roof deck of channel-shaped 20-gage steel panels bolted to the flanges of the top chords, as indicated by a photograph. In addition to the rigid steel roofing, interior bays are stiffened by four horizontal struts between the arch rings, and end bays are wind-braced with a horizontal strut at every chord joint, plus 1-in. diagonal tierods.

Arch ribs rest at both ends on 3x6-ft. corrugated steel base plates carrying channels to which the top and bottom chords are bolted. These base plates are adequate to support the arches on ground having a bearing capacity of about 3,000 lb. per sq. ft.; for soils of less capacity, as on part of the Washington site, spread footings are necessary under the plates. The two ends of each arch rib are joined

(Continued on page 158)

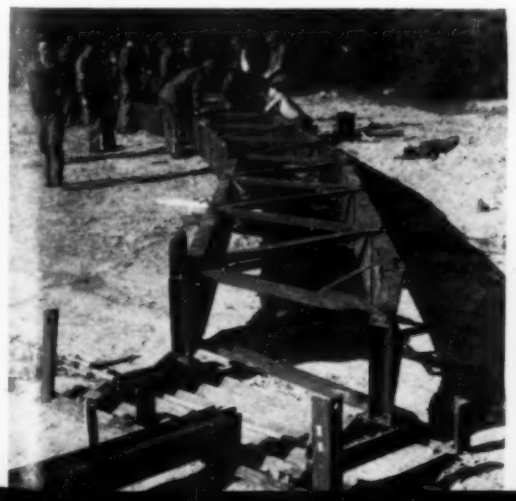
LIFTING TACKLE from two gin poles is hooked up by bridle connection to pulling cable wrapped on drum of winch truck.

SPECIAL FITTING attached to lower chord of arch rib provides attachment for lifting line of tackle used in raising arch.

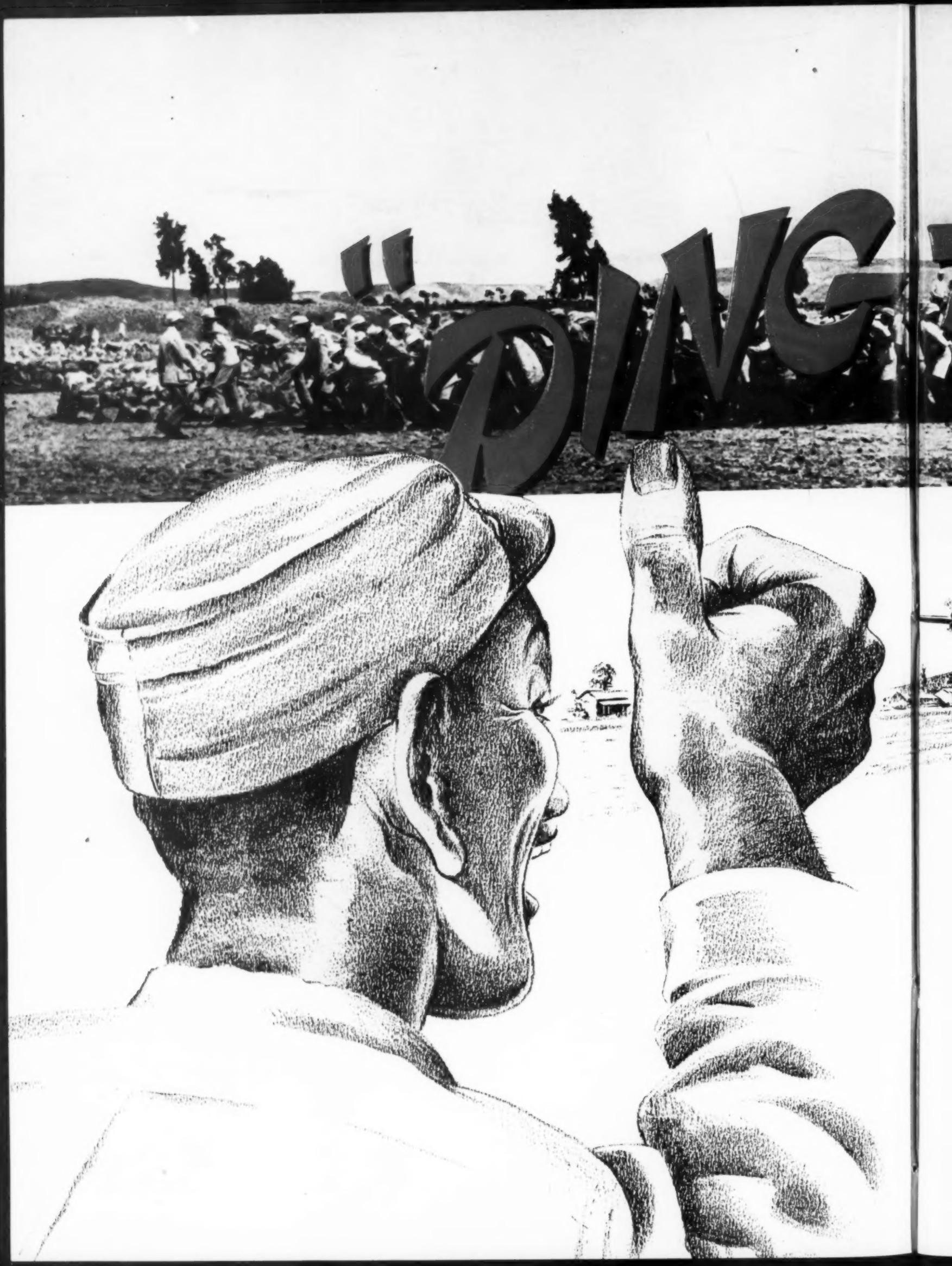
ON FIRST TRIAL INSTALLATION of demountable steel hangar, single gin pole functions satisfactorily in raising assembled arch ribs.

RAISED TO VERTICAL POSITION with single gin pole, arch rib is bolted at both ends to channels on base plates.

HINGED AT BASE PLATE (below) by trunnion connections of upper and lower chords to steel channels, arch rib is completed by bolting assembled segments together in preparation for raising.



COMPLETED HANGAR (below) nearly 200 ft. long has clear inside span of 160 ft. at 15-ft. elevation. Roof deck of steel channel-shaped panels provides stiffening.


"PING

("EVERYTHING'S OKAY")

SHOUTS of "Ding hao!" from grinning Chinese workers greeted B-29 fliers when they returned to China's air bases from their first bombing of the Nips' homeland. "Everything's okay!"... now that Allied bombs repay a long-standing debt. Forgotten are the toil, sweat and blood put into the superfortress fields.

But history will not forget. Recorded for all time is the seemingly impossible feat a half-million Chinese workers accomplished with bare hands and makeshift tools. Longer and more level than any previously constructed forward combat fields are China's vast system of B-29 strips —"so long that a man at one end of the strip can scarcely distinguish a man at the other."

If only tractors with rollers, bulldozers and scrapers . . . motor graders and other modern construction tools could have been available!

A main part of the supplies of all Armed Forces, construction machines are being used IN FORCE, in every theater of war, where it is at all possible to ship, fly or truck them. Ingenuity and mass manpower is the only answer to their lack. Fortunately, China had both. We join in paying tribute to a brave nation. To their "Ding hao!" we say "MORE POWER"... on land as well as in the air . . . and it will come soon!

ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

Present and Accounted For...A PAGE OF PERSONALITIES

READY TO MOVE FORWARD with 18th Naval Construction Regiment at Guadalcanal are (left to right): COMDR. W. W. STUDDERT, Midland, Tex.; LIEUT.-COMDR. H. D. BURNUM, Decatur, Ala.; and LIEUT. (j.g.) J. D. HAGGETT, North Edgecomb, Me.

This regiment set up headquarters under regularly spaced trees of cocoanut plantation in South Pacific area and whitewashed bases of all tree trunks, thereby creating atmosphere suggesting camp neatness.

APPOINTED DIRECTOR of Construction Machinery and Farm Equipment Section of U. S. Treasury's Surplus Property Division is ED. P. PHILLIPS, senior partner of Phillips Machinery Co., of Richmond, Va. Former president of Associated Equipment Distributors, he is a vice president of American Road Builders Association.

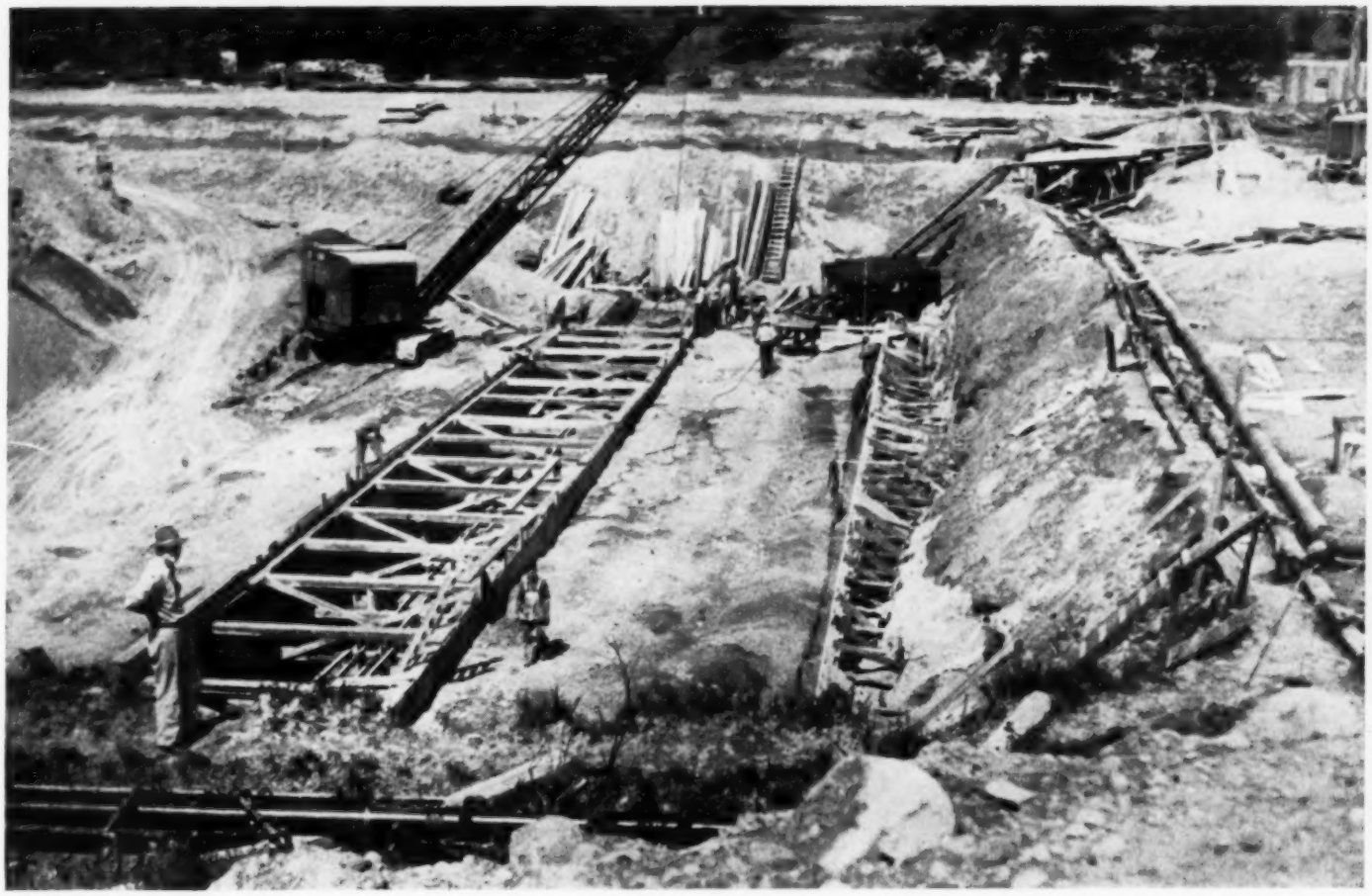
AWARDED DISTINGUISHED SERVICE CROSS, LIEUT. ROBERT PARKER (left), of March Field, Calif., sits at controls of bulldozer used to put out gasoline fire started Jan. 5, 1943 by German night bombing in North Africa. Sergeant of Army Engineers at time, Lieut. Parker, with great presence of mind, leaped into his bulldozer, lowered blade and heaped earth on fire, preventing loss of all fuel at gasoline dump. Signal Corps Photos

NEWLY PROMOTED PLANNING ENGINEER (right) for Chicago Park District is OTTO K. JELINEK, former traffic engineer. Prior to consolidation of park districts in Chicago in 1934, Mr. Jelinek had been traffic and planning engineer for South Park District since 1918. He is credited with installing on Chicago's famous Outer Drive retractable, traffic-separating curbs to get maximum capacity from 8-lane roadway during rush hours.

SECOND ADDITION to rayon fabric mill of Goodyear Tire & Rubber Co. at Decatur, Ala., 280x360-ft. one-story building, is constructed under direction of H. H. GARLAND (below, left), superintendent for Rust Engineering Co., of Pittsburgh, Pa., and W. H. BROWN, resident engineer for Goodyear.

PRESIDENT of newly organized Carolina Road Builders Association, affiliated with American Road Builders Association, is NELLO L. TEER (below), of Durham, N. C. He is president of Mecklenburg Construction Co. and also operates Central Engineering & Contracting Co.

DIRECTING OPERATIONS at TVA's Fontana Dam on Little Tennessee River in western North Carolina are G. E. MURPHY (below, left), construction superintendent, and F. C. SCHLEMMER, project manager. This dam is scheduled for closure within few months.



"It Can't Be Done"

The foundation shown above is for a new power plant in New York State. Excavation material consisted of layers of loam, clay, sand, and gravel—with a river one hundred feet away.

"It can't be dried up with wellpoints", said one wellpoint "expert." "IT CERTAINLY CAN!" said Moretrench—and got the order. The results speak for themselves.

There are many reasons for Moretrench superiority. One of them is that Moretrench Wellpoint Systems have certain patented, mechanical features which enable them to work efficiently under very adverse conditions. It will pay you to investigate these features before placing your next wellpoint order; and to remember that with MORETRENCH—*dry results are guaranteed.*

Catalog on request.

MORETRENCH CORPORATION

90 WEST STREET, NEW YORK 6

3037 SO. CHRISTIANA AVE.
CHICAGO 23, ILL.

ROCKAWAY, N. J.

321 EUTERPE ST.
NEW ORLEANS 11, LA.

Sonotube is the name of Concrete Pier or Column Forms.

Sonotube is not a paper tube adapted for pier or column use.

Sonotube is an especially constructed laminated fibre tube made for pier and column forming.

Sonotube has proven practical for concrete pier forms up to 7′ heights and columns up to 10′ heights.

Sonotube is made in six standard diameters up to 24′ lengths.

INSIDE DIAMETER					
8″	9″	10″	11¼″	12″	13½″
SQUARE INCHES					
50.26	64	78.54	100	113.1	144

Smaller sizes available.

IMMEDIATE DELIVERY

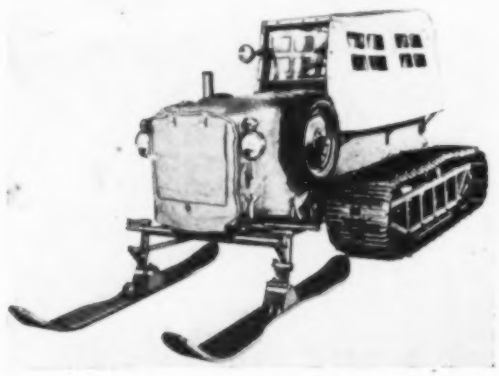
WRITE FOR DELIVERED PRICES

SONOCO PRODUCTS COMPANY
HARTSVILLE, S. C. MYSTIC, CONN.
ROCKINGHAM, N. C. GARWOOD, N. J. LOWELL, MASS.

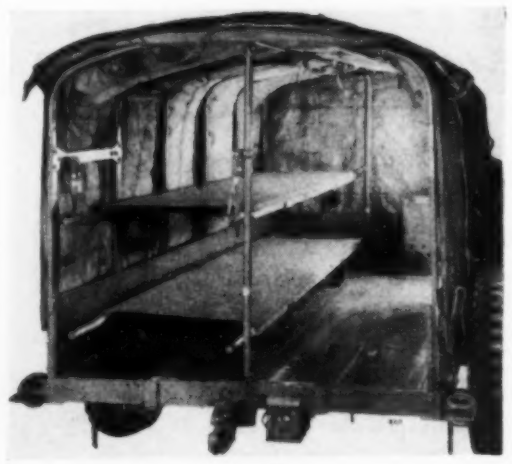
CONSTRUCTION EQUIPMENT NEWS

OCTOBER, 1944 REVIEW of Construction Machinery and Materials

SNOW TRACTOR AND TRAILER COMBINATION consisting of special snow tractor, Model M-7, and a 1-ton snow trailer, Model M-19, is making its appearance regularly in Alaska and the Aleutian Islands with rescue squads of our Armed Forces. Since front axle can be equipped with either wheels or skis, this two-man unit is said to be equally suitable for either snow travel or highways. Tractor is powered with 4-cylinder, 4-cycle gasoline engine, developing 63 hp. at 3,900 rpm., has six forward and two reverse speeds, ranging from 4 to 41 mph. Reverse speeds are 3 to 11 mph., depending on speed range employed. Because of its low center of gravity, tractor can easily climb slopes that may be as steep as 45 deg., depending upon traction available and load being pulled. Trailer weighs 640 lb., including insulated canopy top. Power for lights and body heater is supplied by tractor and at rear of trailer is located a pintle and receptacle for attaching another trailer, if necessary. Tractor seats two men and is provided with a curtain inclosure and heater for low temperature operation. Engine is also effectively winterized with a heavily insulated hood cover and special engine preheater to assist starting.—**Allis-Chalmers Manufacturing Co., Box 512, Milwaukee 1, Wis.**



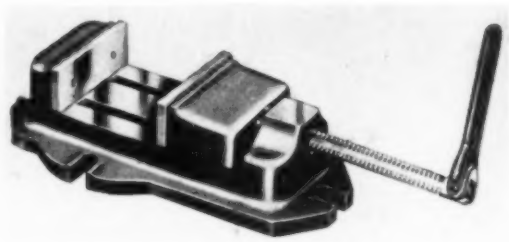
TWO-MAN SNOW TRACTOR has front axle that can be equipped either with skis or wheels making it practical for snow travel or for highway work.

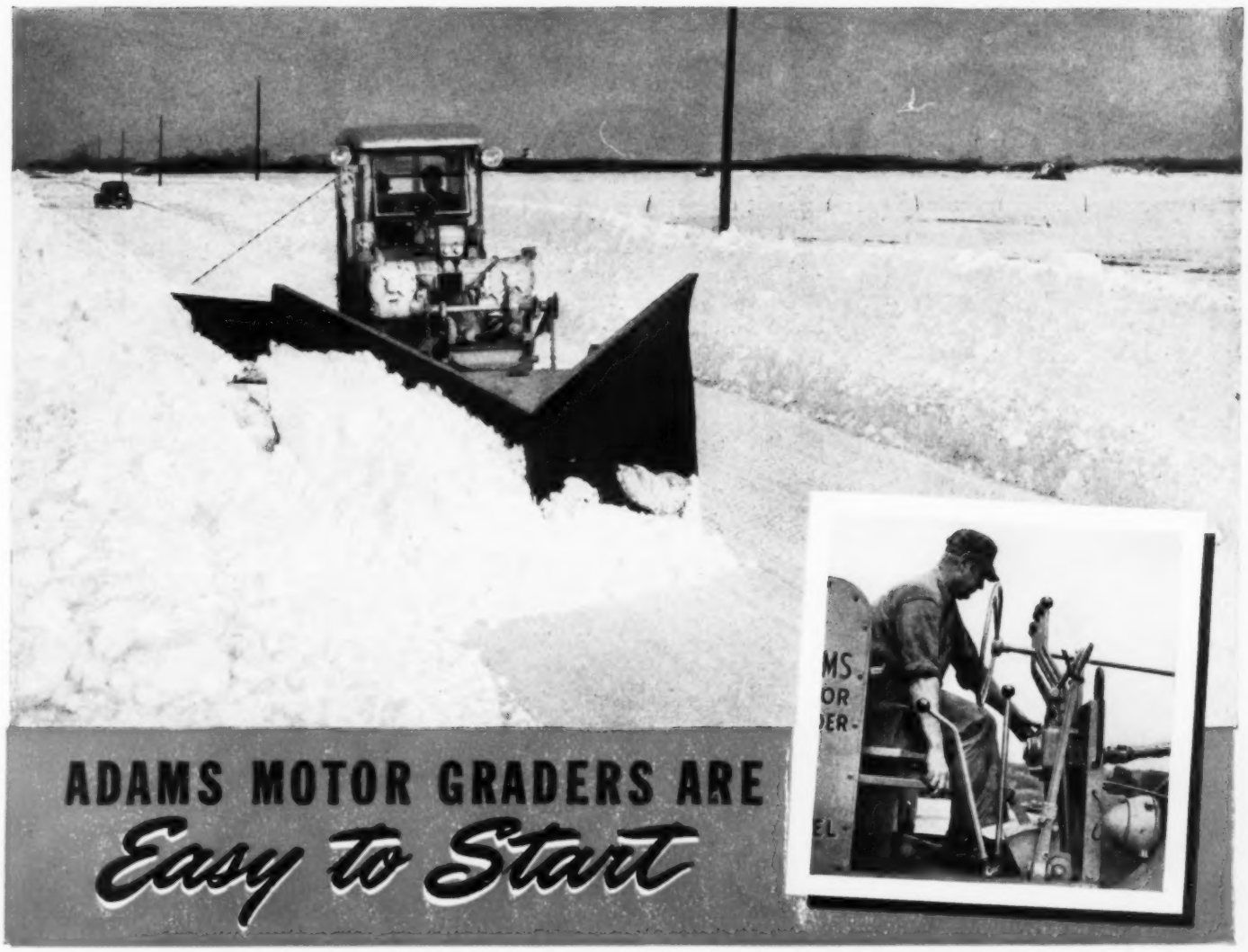


SNOW TRAILER is specially equipped as rescue combination with two litters, heater and heavily insulated canopy top.

★ ★ ★

HEAVY-DUTY VISE is set and released by a Bar-Lok push-pull pressure unit which has a positive locking contact at four points and will develop pressure up to 20,000 lb. Quarter turn of handle is necessary to lock and release. Unit is precision built for heavy-duty service and is available in one size. Height 3½ in. with jaws 1⅝x4¼ in. —**Mechanics Engineering Co., Jackson, Mich.**





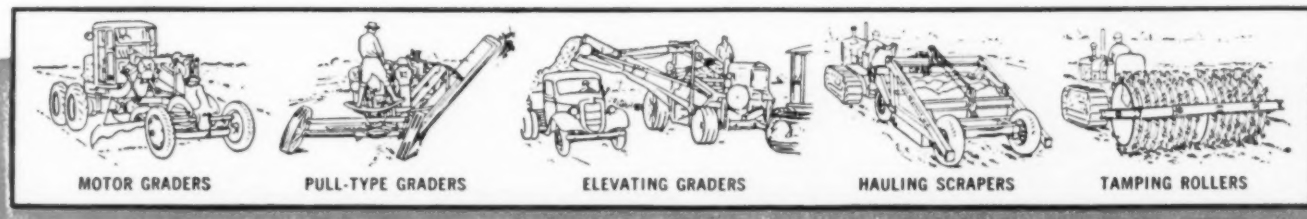
One of a series of ads on Adams motor grader features

One of the most appreciated features of Adams Motor Graders is the ease with which the engine can be started. The International Diesel engines used have built-in gasoline equipment which permits starting the engine with gasoline on low compression. As illustrated above, all the operator has to do is to pull up a conversion lever, press the starter button, and the engine starts immediately. (In the absence of electrical equipment, two or three quarter-turns of the hand crank do the trick.) After a brief warmup period, the operator pushes the conversion lever down, opens up his Diesel throttle and the engine is raring to go as a *full Diesel engine* doing continuous hard work on an average of two gallons of low-price fuel per hour.

This feature saves time, trouble and tempers in cold weather though its simplicity makes it valuable in all seasons. Let your local Adams distributor explain this feature to you in more detail along with other Adams advantages which you will want in the next motor grader you buy.

J. D. ADAMS COMPANY • INDIANAPOLIS, IND.

At war's end we'll need many new roads and many jobs for returning service men. Plan post war projects now and meet both needs.



ADAMS ☆ ROAD-BUILDING AND ☆ EARTH-MOVING EQUIPMENT

PRESSURE DISTRIBUTOR

It's a known fact that the Construction and Maintenance of our Highway System is a vital must for Post War. It's also vital to have the best equipment to do the work, to speed up the program and keep the cost at a minimum.

This is where the Littleford "Spray Master" Pressure Distributor fits into the picture. The "Spray Master" is the most modern spraying unit yet designed; its simplicity and efficiency of operation leads the field. Its Utility, too, makes it a unit necessary for the Construction and Maintenance of Highways, Roads, Runways, etc. With its Spray Bar up to 24 feet in width, Hand Spray Attachment, Transfer facilities, no job is too large or small to handle.

For Better Roads, use the best Equipment—Littleford Black Top Construction and Maintenance Equipment.

LB LITTLEFORD

BLACK TOP ROAD MAINTENANCE EQUIPMENT SINCE - 1900

LITTLEFORD BROS., INC.

465 East Pearl St. Cincinnati 2, Ohio

FIRST SOLUTION OF MANPOWER SHORTAGE

Modern Multiplier of Manpower ... WIRE ROPE

Perhaps while in pursuit of food, which scampered under a fallen tree, some primitive man angrily pulled on a vine tangled around the tree and found that he would not need to call for help to move an otherwise impossible load.

In solving the first manpower shortage, this primitive no doubt wondered who pulled as hard on the other end of the vine as he did on his and little realized he had discovered the principle of the pulley.

Today, the pulley has been multiplied into the block-and-tackle and the latter rove with wire rope so strong and tough that mankind goes on hoisting and moving loads which yesterday were considered impossible.

To Union Wire Rope engineers the impossible is a constant challenge. In the finest of wire rope laboratories they work at the one job of making wire rope stronger and tougher to last longer. The tensile strength, torsional values, fatigue life, ductility, hardness of wires, etc. are predetermined. From numerous tests and checks the pedigree of every run of wire rope is recorded and then, wherever possible, its performance on the job is watched. With Union engineers wire rope making is a specialty in which they do not propose to be excelled.

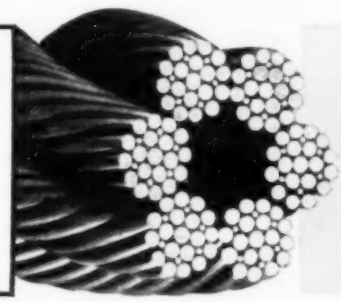
FREE

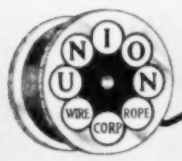
If You Are Not On Our Mailing List send for these bulletins: "Correct Handling of Wire Rope", "Socketing Wire Rope", "Splicing Wire Rope", "Wire Rope Lubrication", "Rope Dope". Engineering information supplied without obligation.

UNION WIRE ROPE CORPORATION, 2160 Manchester Ave., KANSAS CITY 3, MO.
Tulsa Houston Chicago Salt Lake City New Orleans Monahans, Texas
Portland, Ore. Ashland, Ky. Atlanta

B-44

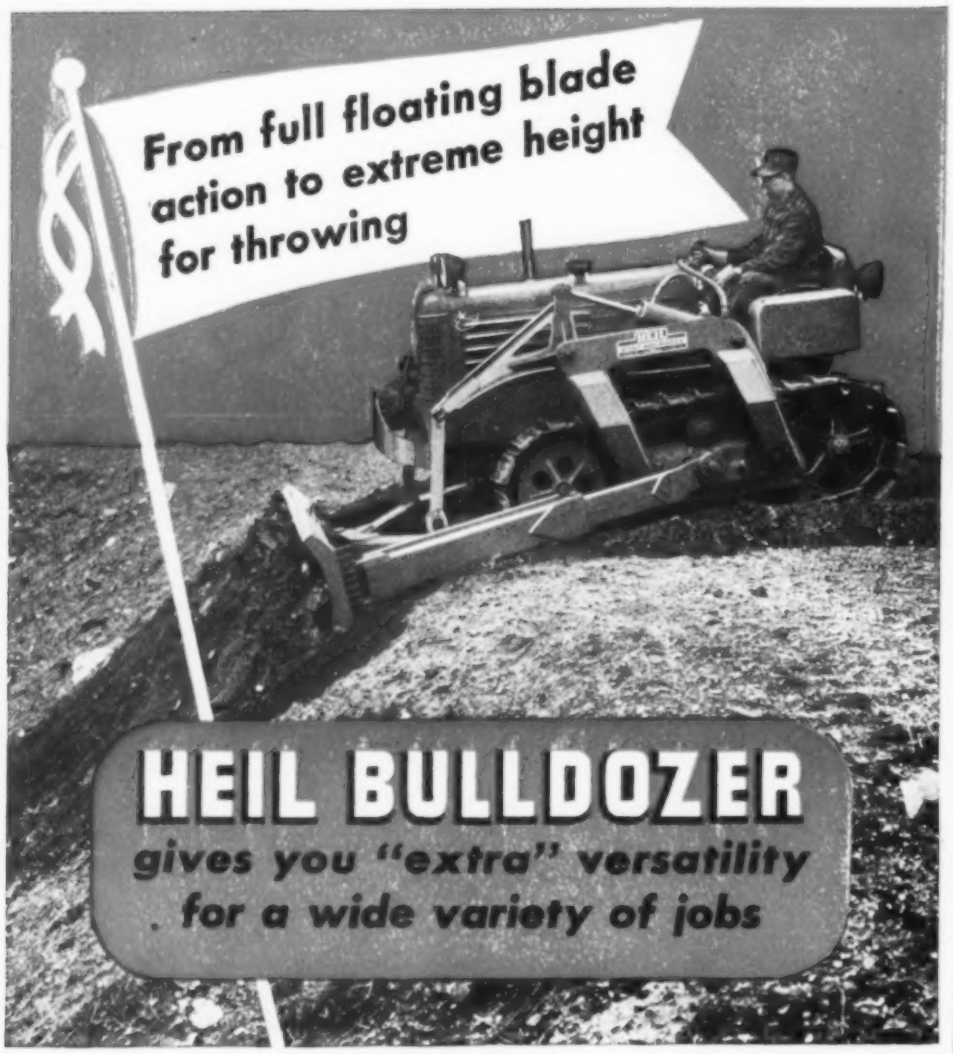
WHEN YOU NEED PREFORMED WIRE ROPE SPECIFY **union-formed**





union *Wire Rope*

"THE ULTIMATE IN LOW COST WIRE ROPE"


From full floating blade action to extreme height for throwing
HEIL BULLDOZER
gives you "extra" versatility for a wide variety of jobs

Tailormade for Cletrac Tractors

One of the big reasons why you like this unit is the fact that you get fast, accurate blade control with the sensitive, dependable Heil hydraulic system. You can let the blade float to "follow through" on "over-the-bank" thrusts, or you can raise it to extreme height.

This Heil hydraulic system is the next thing to a perfect leak-proof unit. It stays in adjustment and gives a minimum of trouble. Perfect balance, full visibility, and many other famous Heil features assure you of many years of satisfactory service and extra profits.

R-38

Write for bulletins

Control Lever Operation is simple, easy, convenient, and troublefree

RAISE position is back; HOLD position is center; DOWN position is forward. To float blade, push control lever to DOWN position until blade touches ground—then push down on control lever knob to release catch and move lever to extreme forward position.

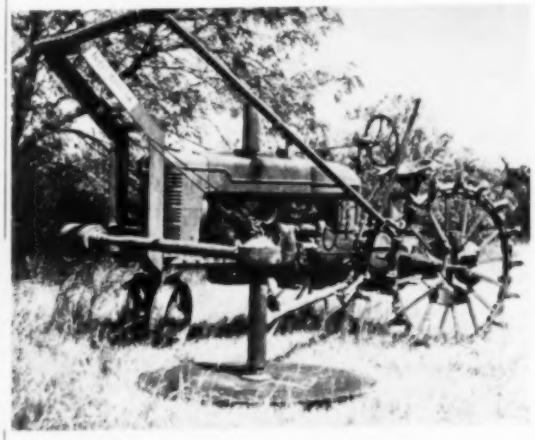
SEE YOUR CLETRAC TRACTOR DISTRIBUTOR

ARMY NAVY

THE HEIL CO.

GENERAL OFFICES • MILWAUKEE 1, WISCONSIN

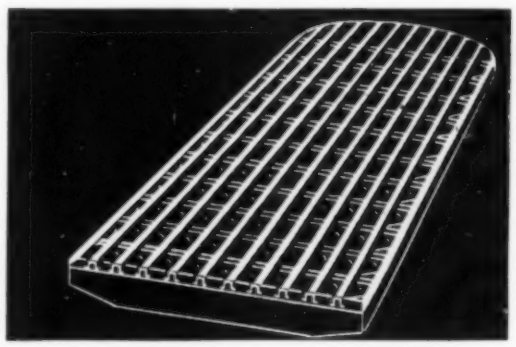
PORTABLE POWER SAW for attachment to the front end of a wheel-type or a crawler tractor, fells trees, mows weeds, saws felled trees into blocks of cord wood lengths, controls mesquite, reclips sprouts and second growth, clears right-of-way for fire lanes, roadways and transmission lines and saws old stumps level with surrounding ground



for land improvements. Saw blade made of toughest steel for heavy-duty work is either 48 or 60 in. in diameter. Blade is sharpened with simple flat files. When used on farm-type tractor, saw is powered from pulley take-off by belt. On crawler tractor, power for operating saw is by fluid drive, and bar supporting saw and controlling felling direction of tree is adjustable. Delivered and shipped complete with belting and all attachments for immediate installation.—**The Jaques Power Saw Co., 524 Littlefield Bldg., Austin 15, Tex.**

★ ★ ★

STEEL-RIBBED FLOOR FOR TRAILERS is said to be capable of withstanding a concentrated load of 1,000 lb. per sq. ft.—2½ times more than conventional all-wood floor of same thickness. Steel ribbed design is radical departure from usual tongue-and-groove type. Hardwood floor boards are bolted down between 10 flanged steel ribs, running nearly



full length of trailer. Flanges of ribs support floor boards and steel joints are flush with top of floor, forming smooth, long-wearing surface. High-tensile-steel ribs are welded to all chassis cross-members, forming integral part of air-plane-type frame construction. With new construction, manufacturers claim that expansion or contraction of boards will not open up cracks in floor, since each floor board is backed up by metal throughout its entire length. This weatherstripping also eliminates buckling which frequently develops in conventional floors. Servicing problem also is said to be greatly simplified as any single board can be replaced without disturbing rest of floor since there are no tongues or grooves to worry about and matched lumber is not required.—**Fruehauf Trailer Co., Detroit, Mich.**

Mo-lyb-den-um

FROM A MAGIC MOUNTAIN

GIVES SUPER-STRENGTH, LIGHTNESS AND DURABILITY TO Moly SHOVELS

REG. U.S. PAT. OFF.

Mo-lyb-den-um is the "miracle mineral," used in making steel alloys of exceptional hardness, toughness and wear-resistance. A "Magic Mountain" in the Rocky Mountains of Colorado, provides the mo-lyb-den-um for Wood's own special analysis Mo-lyb-den-um alloy steel used exclusively in Moly shovels, spades and scoops.

Moly Shovels are normally made in all types, styles and grades needed for every variety of industrial use. Learn to know Moly, unconditionally guaranteed to outwear and out-last any other shovel made.

Illustrated: Moly Closed-Back Shovel with Steel I-Beam Handle Reinforcement

The WOOD SHOVEL and TOOL CO.

PIQUA, OHIO

A national organization specializing *exclusively* in shovels, spades and scoops.

Moly

REG. U.S. PAT. OFF.

MO-LYB-DEN-UM ALLOY SHOVELS

"GULF QUALITY PRODUCTS

AND FINE SERVICE HELP US GET MORE WORK-HOURS FROM OUR EQUIPMENT"

*says this Contractor**

*Austin Road Co., Dallas, Texas, is adding two additional lanes to 8-1/3 miles of highway No. 81 between Fort Worth and a key airport north of this city. Gulf quality lubricants and fuels are helping the contractor get top performance from the many units of equipment employed on this job.

"Proper lubrication with Gulf quality oils and greases helps keep all our equipment in good condition—and Gulf's prompt delivery of lubricants and fuels contributes to fewer delays in servicing it," says this Texas road contractor.* "We're satisfied that we get more work-hours from every unit and lower maintenance costs with Gulf products."

On all types of wartime construction jobs, Gulf quality petroleum products are playing an important part in keeping equipment rolling under tough schedules and punishing operating conditions. Gulf lubricants provide greater protection against breakdowns and mechanical troubles—and Gulf motor fuels help contractors get more efficient performance from their equipment.

Write, wire, or phone your nearest Gulf office now and arrange to use Gulf higher quality lubricants and fuels on your next job. They are quickly available to you from twelve hundred warehouses located throughout thirty states from Maine to New Mexico.

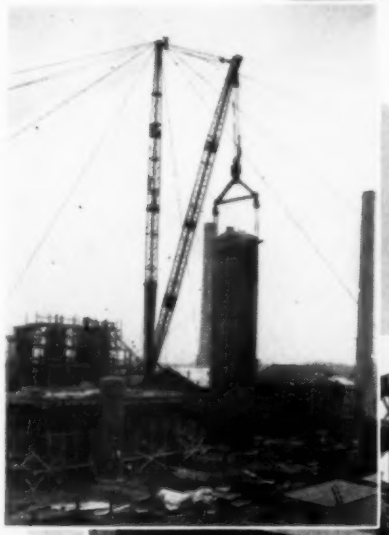
GULF

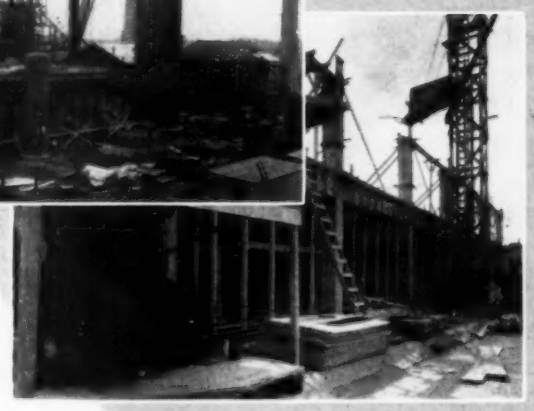
GULF OIL CORPORATION · GULF REFINING COMPANY · GULF BUILDING, PITTSBURGH 30, PA.

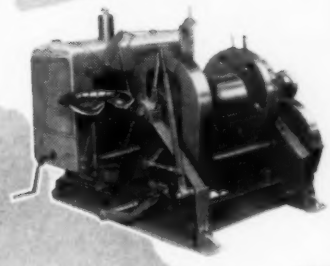
American

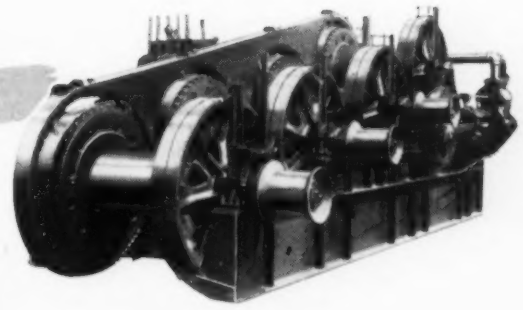
MATERIALS HANDLING FOR EVERY CONSTRUCTION JOB

HOISTS HOISTS HOISTS









What size and type of hoist are you going to need for the new construction work? Whatever your requirements, there is a proved, well-known, modern, late design AMERICAN Hoist for you —from a little, one-ton, single drum hoist up to those powerful, multiple drum hoists for 250 ton derricks, and even larger. Now is the time to find out how these hoists can expedite your materials handling.

4446

Plan now . . . but wait for **AMERICAN!**

AMERICAN MATERIALS HANDLING *for* EVERY INDUSTRY

AMERICAN HOIST & DERRICK CO.

Saint Paul 1, Minnesota

CHICAGO SAN FRANCISCO NEW YORK

Wherever wire rope is fastened . . . . use genuine **CROSBY CLIPS** *with the Red-U-Bolt*

Yes...you get compressed air anywhere with SCHRAMM

Far out on a pier construction job in the ocean . . . you find this Schramm Air Compressor.

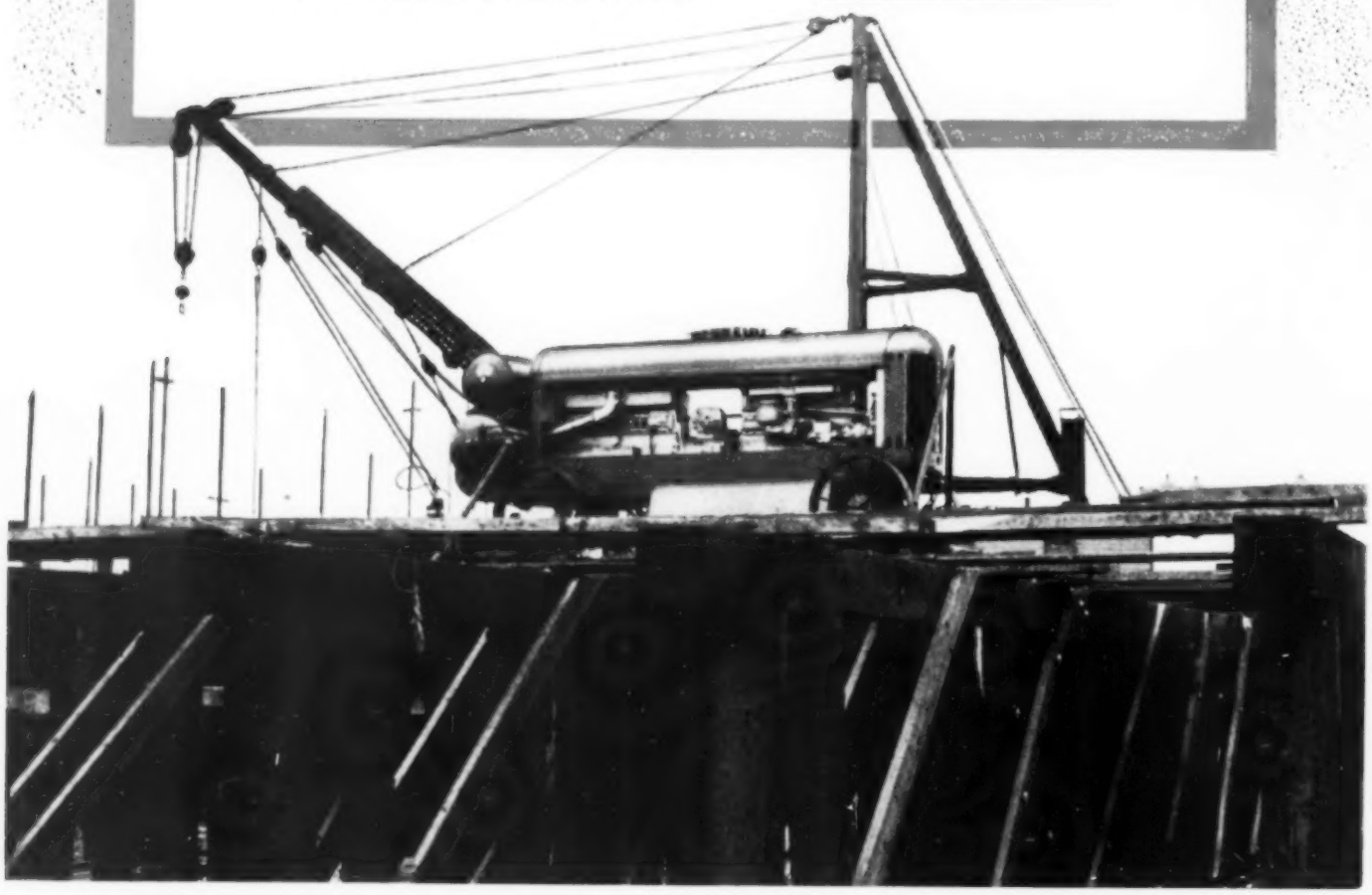
That's the beauty of a Schramm. You're able to take the portable unit anywhere—because they are lightweight, compact, easy to tow about.

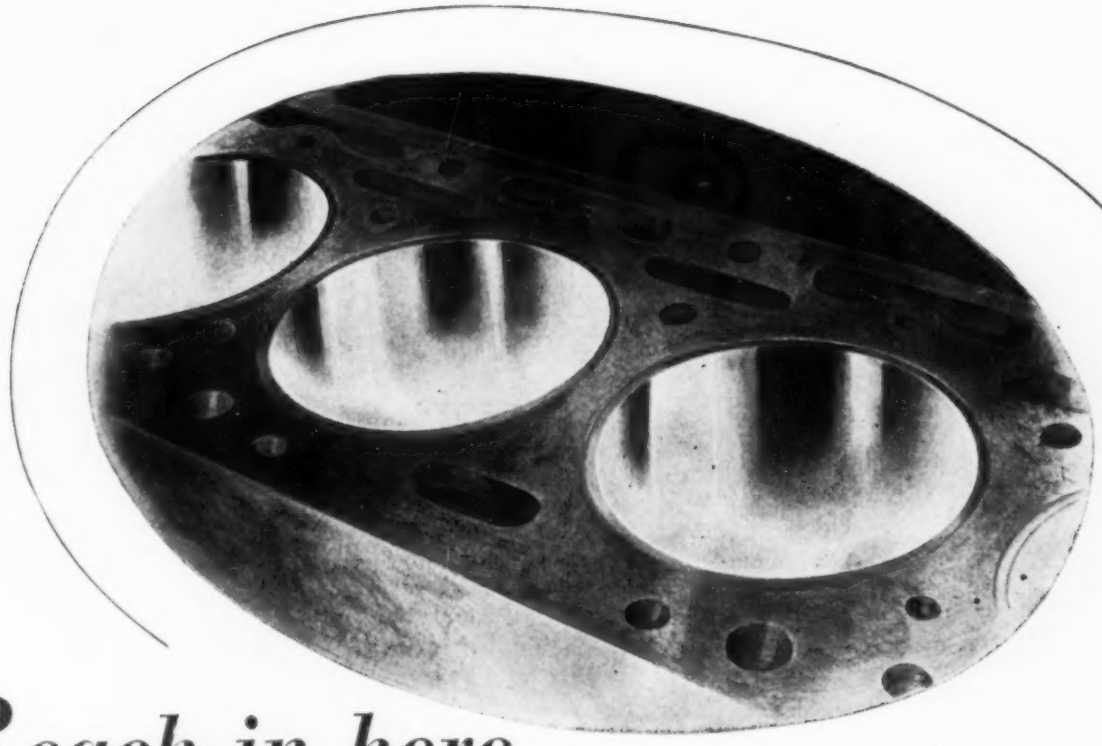
You get all the air you want. Never-failing service results from: 100% water cooled to prevent overheating and freezing . . . mechanical intake valve operating from cam in perfect timing . . . larger discharge valve with lower lift adding to efficiency . . . electric push button starter . . . forced feed lubrication . . . multi-cylinders and lighter parts.

Simplify your construction job by using Schramm Compressors. Write today for Bulletin SE-44.

SCHRAMM INC.

THE COMPRESSOR PEOPLE
WEST CHESTER
PENNSYLVANIA





Reach in here for 350,000 Extra Miles

Extra miles . . . extra hours . . . are in this engine because PORUS-KROME* has been applied to the cylinder walls. This is where the greatest wear occurs in engines and PORUS-KROME extends the life of these walls 4 to 20 times.

The ability to resist corrosion is inherent in chromium and is well known. The ability to resist cylinder wear, also, is inherent in this new form of chromium . . . PORUS-KROME . . . and is being demonstrated daily in thousands upon thousands of engines in use by the Army and Navy, and in essential civilian operations.

PORUS-KROME, produced by the Van der Horst process, is different from ordinary chrome because it has tiny open pores and channels in the surface. These pores and channels serve as reservoirs to hold lubricating oil . . . and then feed it back to the cylinder walls as needed. This excellent lubrication reduces wear, scoring and scuffing to a minimum.

Both corrosion and wear . . . those two enemies of long engine life . . . can be defeated at last. You can multiply the cylinder life of your engines 4 to 20 times . . . specify PORUS-KROME in engines you buy.

* PORUS-KROME is pure, hard chromium, applied to cylinder walls and other bearing surfaces by the patented Van der Horst process. It resists corrosion and wear in cylinders better than any known metal. Records prove that it multiplies cylinder life four to twenty times.

VAN DER HORST
TRADE MARK

U. S. PATENTS 2,048,578 AND 2,314,604

PORUS - KROME

Good for the Life of your Engines

VAN DER HORST CORPORATION OF AMERICA • OLEAN, NEW YORK • CLEVELAND 11, OHIO

AN AFFILIATE OF DRESSER INDUSTRIES

ARMY E NAVY

Write for literature on MALLSAWS, MALL Gasoline Powered and Pneumatic Chain Saws in 24", 36" and 48" sizes, Gasoline Powered, Electric and Pneumatic Concrete Vibrators, Electric Surface Planes and Drills.

MALLSAWS "payoff" on all types of concrete form construction above and below grade by:

REDUCING SAWING TIME—due to high speed and power—plus multiple cutting of like members at one time.

ASSURING SQUARE BOARD ENDS—that eliminate fins and projections.

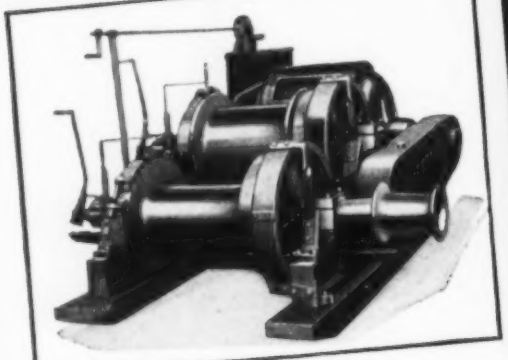
SALVAGING WASTE LUMBER for spreaders, stoppers and bracers.

MALLSAWS are powered beyond ordinary requirements. They are fast and efficient for cross-cutting, ripping, beveling, pocket cutting and other sawing jobs. MALLSAWS also cut metal, cut and score concrete, tile, and stone with an abrasive wheel. They are perfectly balanced for use with either hand. Safety guard on all models.

MALL TOOL COMPANY, 7757 South Chicago Avenue, Chicago 19, Ill.

***Ask Your Dealer for Electric MALLSAWS TODAY**

Mall REG. U.S. PAT. OFF. **PORTABLE POWER TOOLS**



Hoists to Fit the Job

Lidgerwood hoists have earned a 70-year reputation for dependability and efficiency *on the job*. There's a Lidgerwood gasoline, steam, electric or Diesel hoist to fit every construction need. When you need a hoist inquire *first* of LIDGERWOOD.

ARMY E NAVY

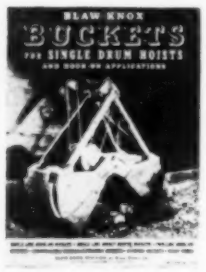
HOISTS FOR:
CABLEWAYS
INDUSTRIAL PLANTS
CONTRACTORS
MINES—DOCKS
RAILWAYS

LIDGERWOOD
ESTABLISHED 1873
Manufacturing Company
MAIN OFFICE AND WORKS · ELIZABETH, NEW JERSEY

NEWS FROM MANUFACTURERS

About Their Products

The publications reviewed below will keep you posted on latest developments in construction equipment and materials available for your use.



BUCKETS — Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh, Pa. (48 pp., illustrated.) This catalog was published with the idea of simplifying the problem of selecting the proper bucket to meet operating requirements when single-drum hoists and hook-on applications are involved. Subjects discussed: How to select, typical method of installation, tables of sizes and typical illustrations of (1) single line hook-on type bucket (normal weight); (2) single line hook-on type (extremely low headroom); (3) single-line and two-line ship's tackle buckets; (4) single line direct reeved type bucket; (5) single line hook-on type bucket (heavy-duty); (6) heavy-duty two-line hook-on type bucket. Miscellaneous subjects treated: (1) Table of ingot tongs and illustrations; (2) table of dumping buckets (tip-over and self-righting types; (3) table of controllable bottom discharge foundry sand buckets; (4) partial list of users.

★ ★ ★

FOUR CENTRALIZED LUBRICATING SYSTEMS—**Stewart-Warner Corp.,** 1826 Diversey Parkway, Chicago, Ill. (4 illustrated catalogs) Describes and illustrates lubricating systems designed for application to small, medium and large heavy-duty machinery as well as to large batteries of machinery where it is desirable to lubricate hundreds of bearings from a central point. Each of the systems provides bearings with a pre-determined amount of lubricant under high pressure and signals the operator when the job is completed. Four new systems are: (1) Alemite Lubro-Meter, handles both oil and grease, lubricates any number of bearings from a central point, may be serviced from hand- or power-operated portable type guns and is also available as a fully automatic system. (2) Alemite Dual Progressive system provides for positive delivery of a predetermined amount of lubricant through a single pipe line to each of a number of bearings, an indicator signalling the operator when lubrication cycle is completed; (3) Alemite Progressive system, a method of centralized grease lubrication which will lubricate from 3 to 20 bearings, feeding each in turn with a predetermined amount of lubricant. System may be mounted on a machine in any convenient location; (4) Alemite Dual Manifold system, dual line method of centralized lubrication, is designed for high pressure grease or oil lubrication that can be applied to any number of bearings on one machine or a battery of machines. It is heavy-duty in construction and particularly adapted to heavy equipment, batteries of machines and outdoor installations.

LIMA is the ticket

LIMA Type 1201 operated by Carl B. Warren Co., Pleasant Grove, Utah. Crane is handling 23 ton load on 60' boom

LIMA is the ticket that assures better performance, lower cost of operation and greater output on the big excavating and material handling jobs that must be done after victory. The fine reputation of LIMA Shovels, Cranes and Draglines as efficient earth moving and material handling machines is based on sound engineering, careful selection of materials and quality of workmanship. LIMA gets the vote of the shovel, crane and dragline user who is careful about his investments and buys for long-time service. Performance records here at home and on the war fronts prove LIMA'S true value. When you buy your next shovel, crane or dragline – why not make it a LIMA.

LIMA LOCOMOTIVE WORKS, INCORPORATED
Shovel and Crane Division . . . LIMA, OHIO

LIMA SHOVELS CRANES DRAGLINES

SHOVELS, ¾ YD. TO 5 YD. CRANES, 13 TONS TO 100 TONS
DRAGLINES, VARIABLE

Here's How to Protect Your Machines This Winter...

Switch Now to the Extra Safety of ALEMITE Winter Lubricants

• Your machines have really been "taking it" all summer. Terrific schedules, record-breaking heat, 'round-the-clock operation. But now you're facing winter, when ordinary greases actually *cause* friction. Your machines are too valuable, parts are too hard to get to risk breakdown. So, play safe and protect your machines! Change now to Alemite *Winter* Lubricants.

ALEMITE GEAR LUBRICANTS

Risking gears this winter means risking whole machines and your business. Alemite *Winter* Gear Lubricants withstand extreme cold and pressures and still protect hard-working surfaces regardless of conditions. Change now and save a machine.

ALEMITE WINTER MOTOR OIL

Around the clock operation wears out ordinary oil fast. Zero weather increases the risk. Alemite Winter Motor Oil—100% Pure Bradford Pennsylvania crude stock—will stand up under the severest operating conditions. Available in all S. A. E. winter grades.

ALEMITE "Sub-Zero" LUBRICANT

Guard vital bearings against cold-weather friction with Alemite Sub-Zero Lubricant. Unlike ordinary grease which actually created friction in cold weather, Alemite Sub-Zero Lubricant stays on the job at temperatures down to 40° below! Switch now and save a machine!

ALEMITE No. 33 LUBRICANT

Exclusive with Alemite! Developed to provide a working temperature range from 25° below to 205° F. Ideal for equipment where bearing loads are high and resistance to rain and muck is vital. Won't clog grease guns or bearing lubricant grooves. This *exclusive* Alemite lubricant lasts longer, too!

Call in the Alemite Lubrication Specialist to explain "on-the-job" power lubrication for complete winter protection of machines. Write for his name to, Alemite, 1840 Diversey Parkway, Chicago 14, Illinois, or Belleville, Ontario.

ALEMITE

First in Modern Lubrication

LUBRICANTS • EQUIPMENT • MAINTENANCE • ENGINEERING • CONSULTATION

American Product of STEWART WARNER

SAFER!
...POSITIVE UNBREAKABLE CONNECTION
TO CONNECT, place ends together, push and twist —they're locked.
TO DISCONNECT, simply pull back sleeves . . .
jaws open automatically.

Thor "PERFECT" AIR HOSE COUPLINGS

Positively locked connection that won't break or come apart.
Greater safety — couplings cannot separate even if one lock becomes caught on something.
Truly universal—no right or left, male or female hose ends. Interchangeable in all sizes to ¾".
Longer life — they're made of alloy steel, heat treated for extra durability; specially processed to prevent rusting.
Quicker operation—disconnect by a simple pull on sleeves; connect by a straight push and slight twist.

EXCLUSIVE DESIGN ASSURES POSITIVE-LOCK CONNECTION

Job-proved tests every day in scores of shops are demonstrating the *greater safety* of Thor "Perfect" Air Hose Couplings.

The ingenious, simple design of Thor Air Hose Couplings provides a positive, unbreakable connection . . . yet one that can be locked and unlocked quickly.

Thor "Perfect" Air Hose Couplings, stocked and sold by leading mill, marine and foundry supply distributors everywhere, can help you do countless air tool jobs *faster . . . safer!* Fill out the coupon below and ask for a demonstration *today*.

Thor *Portable Pneumatic and Electric Tools*

INDEPENDENT PNEUMATIC TOOL COMPANY

600 W. JACKSON BOULEVARD, CHICAGO 6, ILL.

Branches in Principal Cities

INDEPENDENT PNEUMATIC TOOL CO.
600 West Jackson Blvd., Chicago 6, Ill.

Gentlemen:
Please arrange to have your representative call for a demonstration of Thor "Perfect" Air Hose Couplings.

NAME.....

COMPANY.....

ADDRESS.....

CITY.....STATE.....

Climax Portability

PLUS FULL POWER CAPACITY

Speeds Construction Projects

Easy portability, and an uninterrupted flow of ready power are obtained from the Climax R6I (166 hp.) engine installed on this Cedarapids (Road-Mix) plant.

On either new or modernized equipment, Climax engines help provide that extra dependability and low cost operation profitable to maker and contractor. For portable service, the engines are compactly designed, light in weight and highly flexible. They operate with equal efficiency on natural gas, butane or gasoline, and are available in a full size range from 25 to 495 hp.

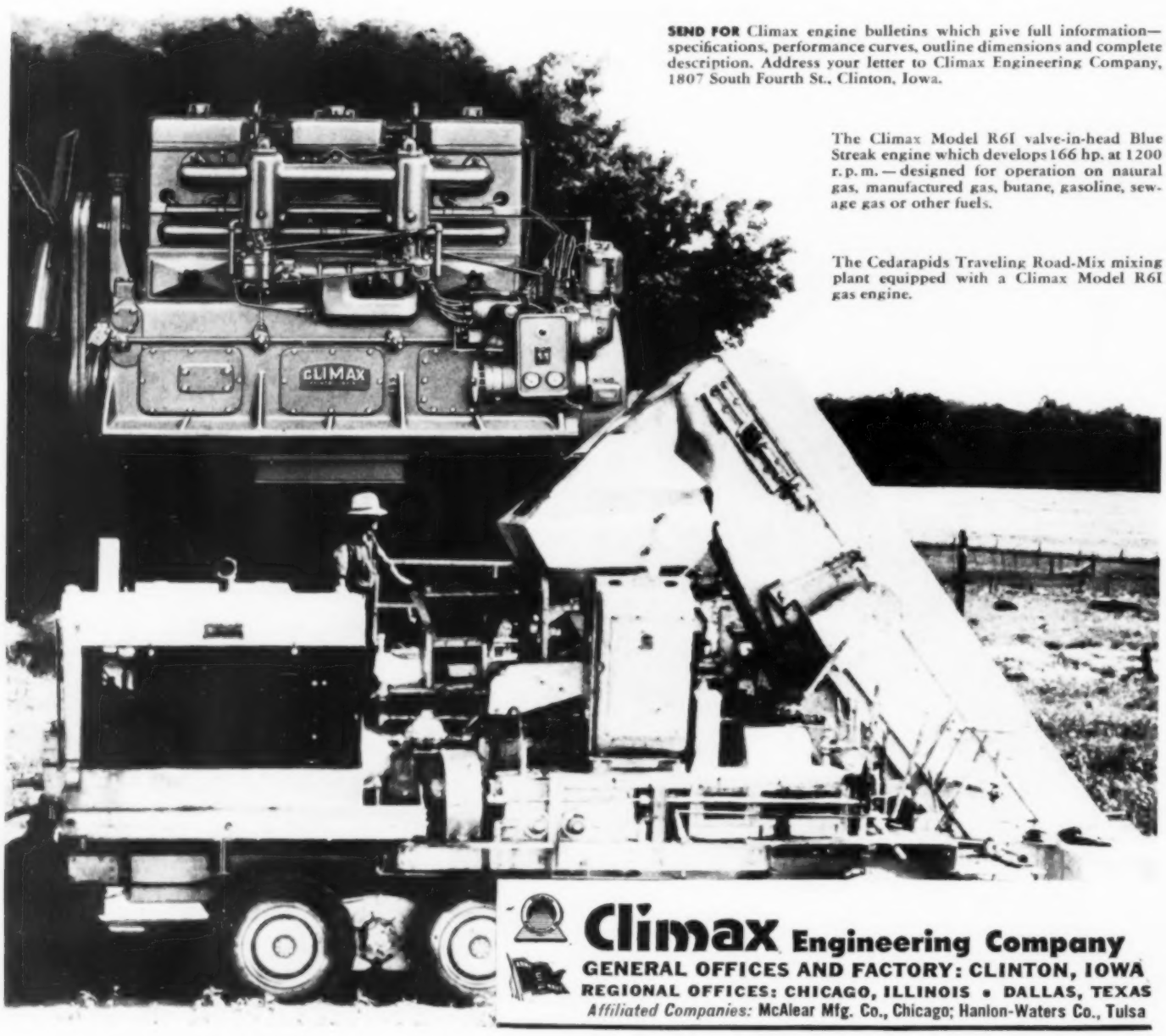
FOR STATIONARY SERVICE

Substantial profits are obtained from Climax engines on stationary service—to drive pumps, compressors, generators and similar loads. The high operating efficiencies, trouble-free performance, low rate of depreciation and useful heat recoveries enable Climax engines to pay for themselves in a very short time.

SEND FOR Climax engine bulletins which give full information—specifications, performance curves, outline dimensions and complete description. Address your letter to Climax Engineering Company, 1807 South Fourth St., Clinton, Iowa.

The Climax Model R6I valve-in-head Blue Streak engine which develops 166 hp. at 1200 r. p. m. — designed for operation on natural gas, manufactured gas, butane, gasoline, sewage gas or other fuels.

The Cedarapids Traveling Road-Mix mixing plant equipped with a Climax Model R6I gas engine.



Climax Engineering Company
GENERAL OFFICES AND FACTORY: CLINTON, IOWA
REGIONAL OFFICES: CHICAGO, ILLINOIS • DALLAS, TEXAS
Affiliated Companies: McAlear Mfg. Co., Chicago; Hanlon-Waters Co., Tulsa

AMERICA IS *Built with Aggregate!*

Guardian of City Health!

Safeguarding the health of cities is one important job huge sewage disposal plants perform so ably. Contagious diseases which formerly ravaged the country have been practically stamped out by the effective treatment of sewage.

Large quantities of aggregates are used in the construction of filters, settling tanks, and buildings, in addition to the four- or five-foot thick layer of special crushed stone for the trickling filters.

Whether you are producing aggregate for municipal plants, bridges, highways, stadium or airport, you'll get better results and it will cost you less if you use Cedarapids aggregate producing and crushing equipment.

More Cedarapids equipment is now available for contractors. Let us help you secure the necessary releases and priorities.

IOWA MANUFACTURING COMPANY
CEDAR RAPIDS, IOWA

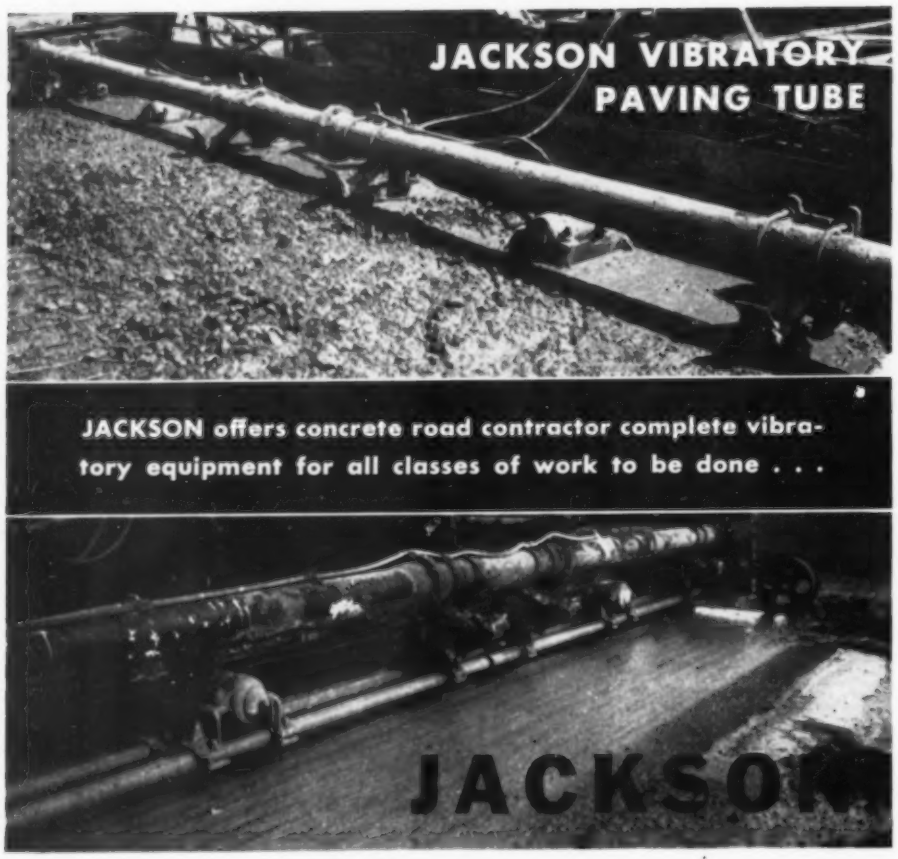
Cedarapids
Built by IOWA

THE IOWA LINE

of Material Handling Equipment Includes

ROCK AND GRAVEL CRUSHERS
BELT CONVEYORS—STEEL BINS
BUCKET ELEVATORS
VIBRATOR AND REVOLVING SCREENS
STRAIGHT LINE ROCK AND GRAVEL PLANTS
FEEDERS — TRAPS
PORTABLE POWER CONVEYORS
PORTABLE STONE PLANTS
PORTABLE GRAVEL PLANTS
REDUCTION CRUSHERS
BATCH TYPE ASPHALT PLANTS
TRAVELING (ROAD MIX) PLANTS
DRAG SCRAPER TANKS
WASHING PLANTS
TRACTOR-CRUSHER PLANTS
STEEL TRUCKS AND TRAILERS
KUBIT IMPACT BREAKERS

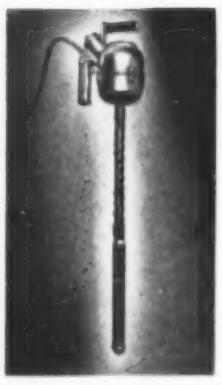
FAIRCHILD AERIAL SURVEYS, IN


JACKSON VIBRATORY
PAVING TUBE
JACKSON offers concrete road contractor complete vibratory equipment for all classes of work to be done . . .
JACKSON

Heavy duty, full width vibratory paving tubes for attachment to any standard finisher of modern design. Made to order in all widths from 10 to 25 ft. inclusive.

Electric Flexible Shaft or Hydraulic Powered **internal vibrators** for puddling concrete at side forms and transverse joints and for gutter, bridge and culvert construction. Vibratory Hand Screeds for odd sections, approaches, ramps and walks.

Plus Portable, gas-electric power plants, strongly built, conservatively rated. All models generate 110 volt, 3 phase, 60 cycle, A.C. for electric vibrator and paving tube operation; 110-120 volt, single phase, 60 cycle, A.C. for running saws, drills, etc., and lights.



Electric motor powered, flexible shaft vibrator for puddling concrete at side forms and joints.

WS-4 Power Plant, 2000 watts, 750 and 5000 watt models also available.

Electric vibrator with bent rigid handle for puddling concrete at joints and side forms. 4" x 18" head.

ELECTRIC TAMPER & EQUIPMENT CO.
LUDINGTON MICHIGAN

Step-by-Step Field Methods

(Continued from page 78)

mockup it was possible greatly to increase the quantity of pipe prefabricated.

In a similar manner, electrical and mechanical work is also preassembled before installation resulting in a great man-hour savings.

As in the case of most shipyards, the bottleneck of production has been welding. To increase the production of the yard, a large subcontracting program has been started and work has been let out to various steel fabricating shops within a radius of 450 mi. of Mobile, including New Orleans, La.; Birmingham, Ala.; Houston, Tex.; Decatur, Ala.; and Lucedale, Miss. This subcontracting supplements the yard production by about 30 per cent of the welding in a ship and has

(Continued on page 106)

Get Maintenance Off To A Flying Start!

To reduce time out for repairing, overhauling or repainting your equipment . . . to put it back in service on war construction projects FASTER . . . try Oakite steam - detergent cleaning with the

OAKITE SOLUTION-LIFTING STEAM GUN

Provides TRIPLE COMBINATION of heat, mechanical force and detergent action that removes oil, grease and muck in a jiffy! Cleans surfaces up to 12 feet high without pumps, motors or injectors. FREE, 24-page booklet gives complete details.

OAKITE PRODUCTS, INC.
24G Thames Street, New York, N.Y.
Technical Service Representatives Located in All Principal Cities of U.S. and Canada

OAKITE *Specialized* **CLEANING**

TIMKEN TORTURE TEST NO. 21454

Your assurance of reliable performance of Timken Axles and Brakes is found in the "Torture Tests" going on day after day in Timken's modern engineering laboratories.

Every new design, whether it be a complete axle or a new type of hardened pin, is Torture Tested under conditions far more severe than it will encounter in daily service. Production units and parts, even though they have proved satisfactory in years of service, are constantly "check-tested" too.

Typical of these Torture Tests is the spiral bevel gear and pinion set illustrated above. This is just one of hundreds of tests, in which several sets of gears, all of one model and ratio, are run to destruction under maximum torque input. Tests of similar gear sets are made under identical conditions at slow speed, where the greatest tooth load is imposed and lubrication is most difficult.

If performance is not up to Timken's high standards, changes are made in design or materials and the tests repeated.

From these and hundreds of other severe tests—in the laboratory and on the road—Timken engineers are constantly learning how to still further improve Timken Axles and Brakes. To these men, whose combined axle engineering experience totals hundreds of years, every Torture Test is a new challenge—an opportunity to make Timken products better.

38 YEARS OF AXLE ENGINEERING LEADERSHIP

TIMKEN AXLES

THE TIMKEN-DETROIT AXLE CO., DETROIT 32, MICH.
WISCONSIN AXLE DIVISION, OSHKOSH, WISCONSIN

ARMY E NAVY
For Production "Well Done"

A Griffin Wellpoint Job

They got Nowhere Fast

...UNTIL...

. . . until they put Griffin Wellpoints to work! The job was to lower water level (near the surface) a total of 17 feet. Soil condition was a top stratum of bog on a 3 foot stratum of sand on top of sand-plus-silt—very dense, difficult-to-drain, unstable. Yet Griffin Wellpoints, installed for one section of the job, so thoroughly predrained *the whole area* that no additional Wellpoints were needed!

Results count — Why say more?

●

For Sale and for Rent

MID-WEST

GRIFFIN EQUIPMENT CO., INC.
548 Indiana Street • Hammond 1662
HAMMOND, INDIANA

SOUTH

GRIFFIN ENGINEERING CORP.
633 N. Myrtle Ave. • Jacksonville 5-4516
JACKSONVILLE, 4, FLA.

MAIN OFFICE: 881 EAST 141st STREET, NEW YORK 54, N. Y.

GRIFFIN WELLPOINT CORPORATION

(Continued from page 104)

proved to be very successful. The work subcontracted is, in general, work that can be shipped by railroad. The items subcontracted, for example, are miscellaneous foundations, gun foundations, deck cargo frames, life raft supports, fittings to masts and kingposts, and small hull sections.

The tanker program started in January, 1943 (see CONSTRUCTION METHODS, September, 1943, p. 68) and has built up to a present working force of 21,500 men, with a peak of 25,000 one year ago. The production of the yard has increased in this period to four ships per month and the days to build a ship, from keel laying to delivery, have been reduced from 400 days to 107 days. This result was accomplished in spite of the fact that only a small proportion of the force of men at work had any previous shipbuilding experience.

★ ★ ★

Postal Concentration Center

(Continued from page 62)

the finished floor and serve as fenders to guard the wood columns from damage by the wheels of small storage-battery mail-carrying trucks which will ply throughout the building.

Support for the load-bearing cinder-concrete block walls of the building is provided by reinforced concrete grade beams 12 in. wide and with a minimum depth of 2 ft. 4 in. on spread footings, extending between 2x3-ft. piers at column bases or under concrete-block masonry piers built into the walls to support the ends of the roof trusses. Typical details of piers, spread footings and grade beams are illustrated herewith.

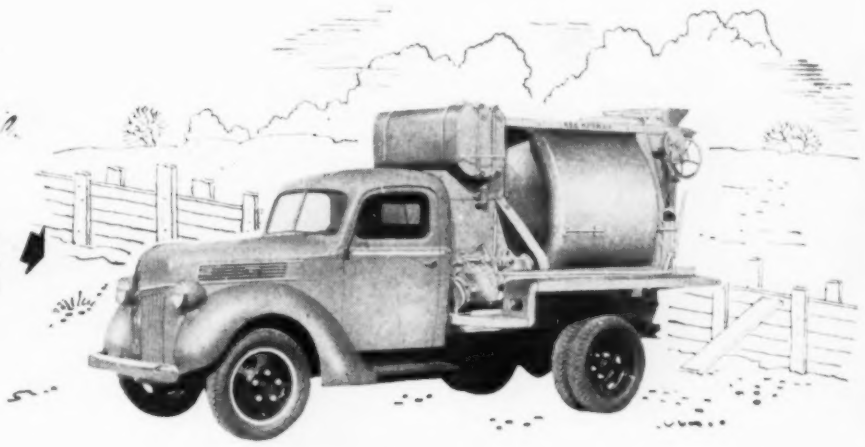
Ready-mixed concrete for the substructure was delivered by Jaeger truck-mixers of the Colonial Sand & Stone Co. and deposited within 2x3-in. Uni-Form plywood-faced panel forms in 2x3-ft. steel frames, and properly spaced to produce a wall of required thickness by steel ties notched to break off ½ in. inside the wall.

Atop pile caps or spread footings, which carry the columns of the roof truss, the 18-in.-diameter cylindrical

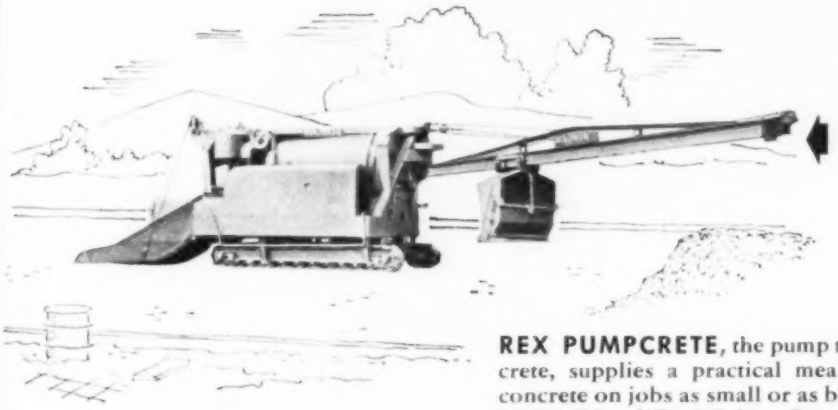
(Continued on page 110)

FOR EFFICIENT-ECONOMICAL CONCRETE CONSTRUCTION AND MOVING OF WATER

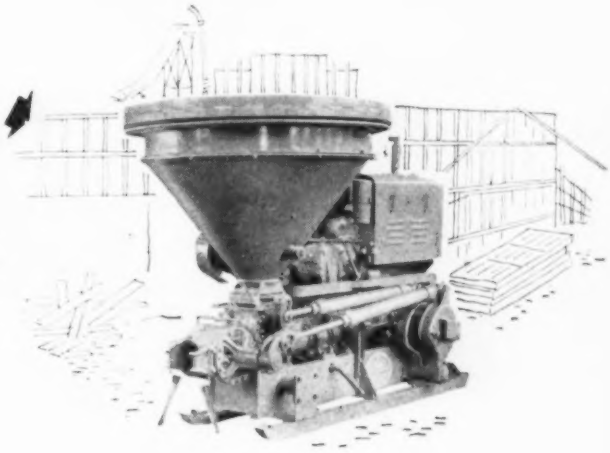
REX MIXERS are leaders at the job of producing high quality concrete for everything from basements to bridges . . . factories to homes. Soundly designed and ruggedly built for top performance, they speed up mixing and placing concrete wherever they are used. Available in 3½S, 5S, 7S, 10S, 14S and 28S sizes.



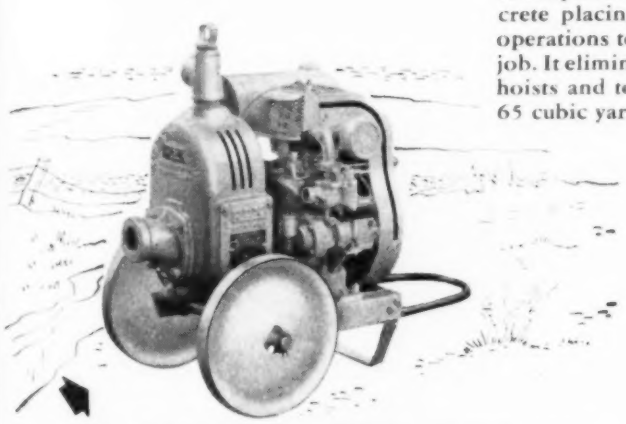
REX MOTO-MIXERS are proved superior by actual job performance and operator preference. Simplicity and ease of operation result in most efficient and economical mixing and placing of specification concrete. Rex Moto-Mixers are available in all standard sizes.



THE REX 34E DOUBLE DRUM PAVER has an unusual performance record for high volume production and smoothness of handling. Operation is controlled by the Rex Mechanical Man, resulting in the fastest possible mixing cycle. The Rex Paver is by far the most modern and efficient paver built.



REX PUMPCRETE, the pump that pumps concrete, supplies a practical means of pumping concrete on jobs as small or as big as they come. It simplifies difficult jobs, effects savings in concrete placing costs and better co-ordinates all operations to permit faster completion of entire job. It eliminates the need for buggy runs, chutes, hoists and towers. Capacities range from 15 to 65 cubic yards per hour.



REX SPEED PRIME PUMPS are high capacity, self-priming, centrifugal pumps used for general dewatering and supply purposes for construction jobs. They are sturdily built, with capacities ranging from 3000 up to 125,000 gallons per hour. Gasoline or electric power operated.

Rex Engineers are specialists in the design, manufacture and application of equipment for mixing, hauling and placing of concrete and the moving of water. Write for illustrated booklets containing the complete facts and engineering data. Address Chain Belt Company, 1664 West Bruce Street, Milwaukee 14, Wisconsin.

CHAIN BELT COMPANY
of Milwaukee

REX

CONSTRUCTION MACHINERY

PUMPS PAVERS PUMPCRETES MOTO-MIXERS MIXERS

SOUTHWEST *Hauling Scoop*

SINGLE CABLE CONTROL

Here it is—the first rear dump hauling scoop with *single cable control!* No longer is it necessary to have hydraulic equipment to have a rear dump unit. Southwest does it with the single cable control. And here are some of the advantages: Dumps safely over embankments—Works well in difficult places —Dumps while moving forward, backward or standing still—Shortens operational cycles by *controlled* spreading. Sturdy design and construction to handle tough jobs easily. Ideal for road maintenance and repair.

Four page bulletin available on request. Gives engineering data on the three standard sizes of Southwest Hauling Scoops. Write Department A130 Southwest Welding & Manufacturing Company, Alhambra, California.

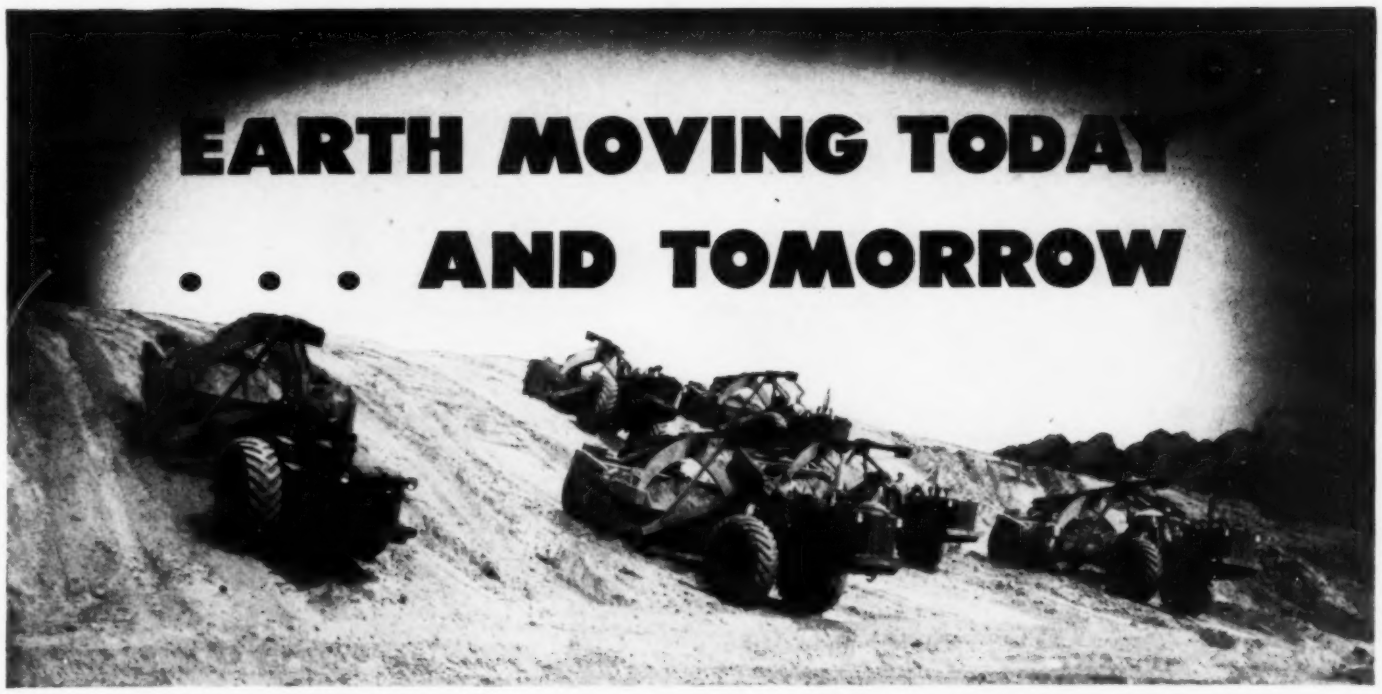
The Southwest Single Cable Control Scoop can be operated by a single drum or as a "dozer scoop" combination with double drum unit.

CONSTRUCTION MACHINERY DIVISION

Southwest Welding & Manufacturing Co.

ALHAMBRA, CALIFORNIA

WINCHES BULLDOZERS CRANES TANKS DUMP WAGONS RIPPERS TAMPERS SCRAPERS



BIG TIRES . . . built by Firestone . . . are speeding the day of total victory for the United Nations. They're moving earth to build landing fields, roads and bridges faster than they've ever been built before.

Your postwar projects . . . building highways, flight strips, airports, dams and waterways . . . will call for speed and flotation . . . for longer, faster hauls. You'll need big tires to speed up these new jobs and do them at lower cost.

Firestone pioneered the big, rugged tires for modern earth moving equipment. It will pay you to talk over your plans for tomorrow with the Firestone tire representative. He will show you how big tires made by Firestone can help you increase your postwar profits.

Listen to the Voice of Firestone and the Firestone Symphony Orchestra, Monday evenings, over N.B.C.

Copyright, 1944, The Firestone Tire & Rubber Co.

(Continued from page 106)

pedestals are cast within pairs of semi-circular metal forms, bolted together. For the entire building there are nearly 800 column footings.

War shortages of materials normally available for building such a structure as the big Postal Concentration Center and the need for exceptional speed to complete the superstructure for "beneficial occupancy" within the time limit of only 72 days were controlling influences in the design. Steel has long been on the critical list, while lumber, according to a recent statement by the War Production Board "is now in a position comparable to that of metals at the beginning of the war. The supply is inadequate to take care of all lumber demands." In place of an all-steel or an all-timber frame, therefore, the design finally adopted called for the use of load-bearing walls (both exterior and interior divisional, or fire, walls) of precast cinder concrete blocks, thus limiting the use of lumber to simple prefabricated trusses and laminated columns to carry the roof. A further reduction in demands upon the limited supply of lumber

(Continued on page 116)

ON EVERY CONSTRUCTION FRONT—

M·S·A·

SKULLGARDS

KEEP HEADS SAFE *ON-THE-JOB!*

IN ACTION on the biggest construction jobs and contracts of every size throughout the nation, these favorite work hats keep men on the job by keeping heads safe. Skullgard's laminated bakelite construction, one-piece molded, provides durability and resistance to impact proved by years of hard service—*comfort* proved by the greatest popularity enjoyed by any protective hat. 8 different models to choose from!

Type K—standard of the industry. Trim "doughboy" shape for all-around protection.

Write

for your copy of this descriptive M.S.A. Skullgard Bulletin. Fully detailed—ask for Bulletin No. DK-11.

MINE SAFETY APPLIANCES CO.

BRADDOCK, THOMAS AND MEADE STREETS

PITTSBURGH, PA.

DISTRICT REPRESENTATIVES IN PRINCIPAL CITIES

UNION

EST. 1900

Union Iron Works, Inc.

ELIZABETH, New Jersey

P&H truck cranes

GET THERE—AND HANDLE IT

. . . *IN A HURRY!*

Wherever the job may be — in congested business areas or out at the edge of town — you can get there with a P&H Truck Crane almost as quickly as you'd drive your own car.

It's the kind of mobility that avoids delays, speeds work, and cuts costs on all kinds of construction and materials handling jobs.

BETTER IN EVERY WAY

- Completely new in design.
- Exceptionally low center of gravity assures greater stability.
- No sway at boom point. P&H's weave-proof box section frame eliminates this.
- Complete hydraulic control planetary boom hoist and planetary lowering mechanism for faster, easier, and safer operation.

The new P&H Truck Cranes assure greater tugging power with double drive axles in tandem—with ten speeds forward and two in reverse. Easier steering is assured with double cam and roller bearing. Complete information is available on request.

60 YEARS OF SERVICE 1884 · 1944

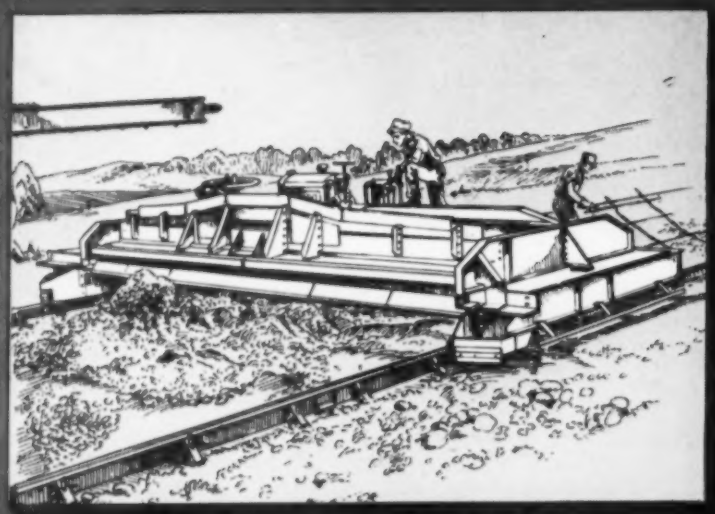
P&H HARNISCHFEGER CORPORATION

Electric Cranes • Electric Hoists
Excavators • Welding Positioners
Arc Welders • Welding Electrodes

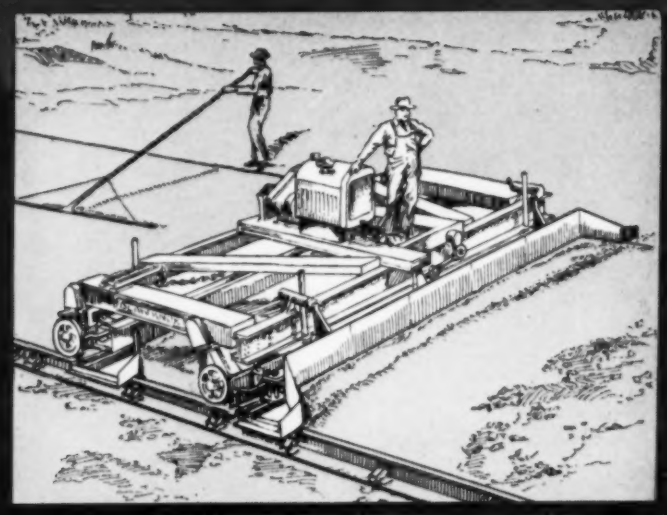
EXCAVATORS · ELECTRIC CRANES · ARC WELDERS · HOISTS · WELDING ELECTRODES · MOTORS

General Offices:
4494 West National Avenue, Milwaukee 14, Wisconsin

BLAW-KNOX *has the answers to*

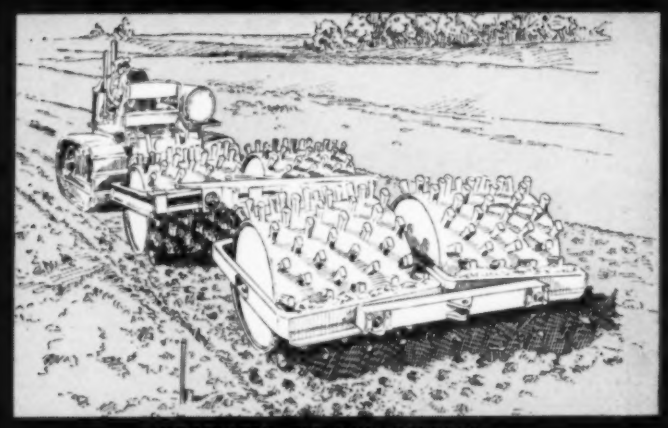


PAVING SPREADERS FOR AIRPORTS AND ROADS

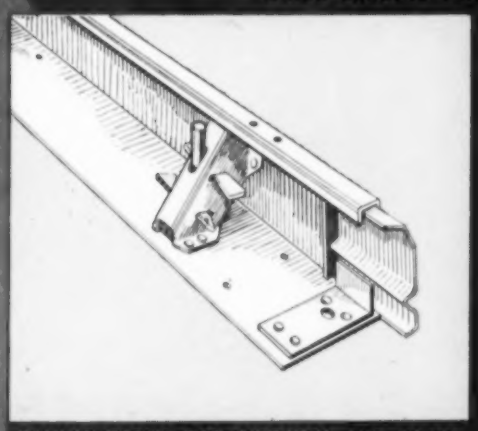


FINISHING MACHINES FOR AIRPORTS AND ROADS

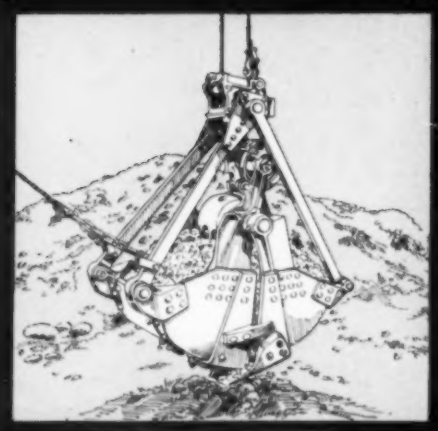
TRUCK MIXER LOADING PLANTS



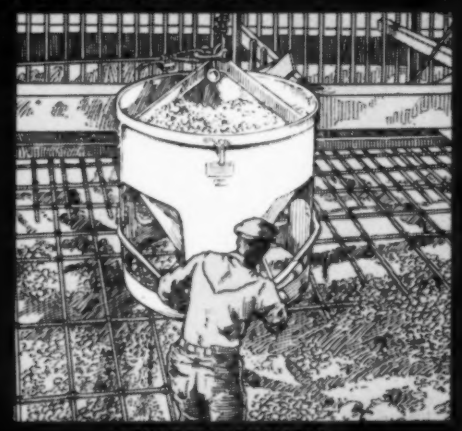
SHEEPSFOOT TAMPING ROLLERS



PAVING FORMS FOR AIRPORTS AND ROADS



CLAMSHELL BUCKETS



CONCRETE BUCKETS

KNOW YOUR BLAW-KNOX DISTRIBUTOR

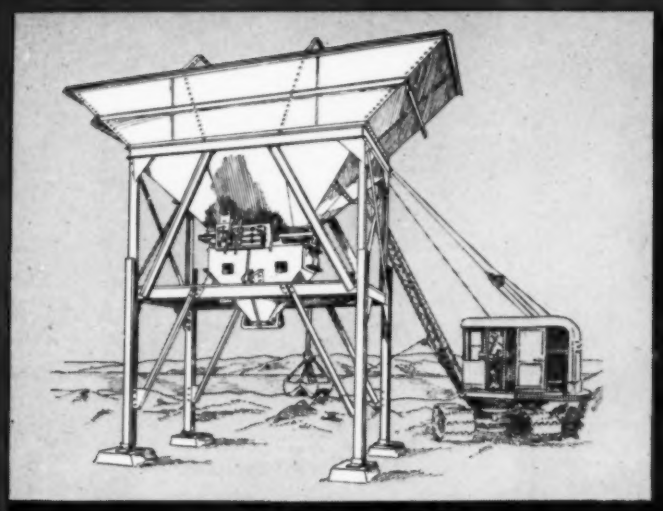
ALABAMA
Birmingham — Standard Con. Supply Co.
ARIZONA
Phoenix — State Tractor Equipment Co.
ARKANSAS
Little Rock — Lyons Machinery Company
CALIFORNIA
Los Angeles — Le Roi-Rix Machinery Co.
E. M. Ornitz
San Francisco — C. H. Grant Company
COLORADO
Denver — Ray Corson Machinery Co.
CONNECTICUT
New Haven — W. I. Clark Co.
DELAWARE
Philadelphia, Pa. — Giles & Ransome
DISTRICT OF COLUMBIA
Washington — Matt A. Doetsch Mach. Co.

FLORIDA
Jacksonville — Florida Equipment Co.
Miami — Florida Equipment Company
Tampa — Epperson & Company
GEORGIA
Atlanta — W. C. Caye & Company
IDAHO
Boise — Intermountain Equip. Co.
ILLINOIS
Chicago — O. T. Christerson Co.
St. Louis, Mo. — O. B. Avery Company
INDIANA
Indianapolis — Reid-Holcomb Co.
Chicago, Ill. — O. T. Christerson Co.
Louisville, Ky. — Brandeis Mach. & Supply Co.
IOWA
Davenport — Gierke-Robinson Co.
Des Moines — Herman M. Brown Co.

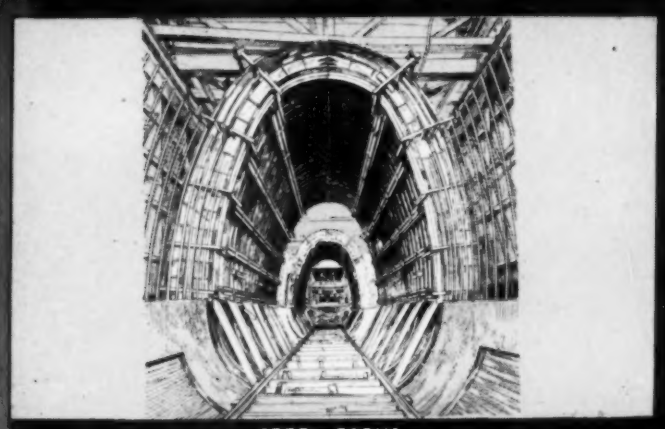
KANSAS
Kansas City — G. W. Van Keppel Co.
KENTUCKY
Louisville — Brandeis Mach. & Supply Co.
LOUISIANA
New Orleans — Southern States Equip. Co.
MAINE
Portland — Stanley Cadigan Company
MARYLAND
Baltimore — Henry H. Meyer Co., Inc.
MASSACHUSETTS
Boston — The Equipment Company
New Haven, Conn. — W. I. Clark Co.
MICHIGAN
Detroit — Wm. P. Favorite Company
Grand Rapids — Contractors Mach. Co.
Iron Mountain — Service & Supply
Division of Lakeshore Engineering Co.

MINNESOTA
Duluth — Borchert-Ingersoll, Inc.
St. Paul — Borchert-Ingersoll, Inc.
MISSISSIPPI
Amory — Dalrymple Equip. Co.
New Orleans, La. — Southern States Equip. Co.
MISSOURI
Kansas City — G. W. Van Keppel Co.
St. Louis — O. B. Avery Company
MONTANA
Billings — Western Const. Equip. Co.
NEBRASKA
Omaha — Anderson Equipment Co.
NEVADA
Los Angeles, Cal. — E. M. Ornitz
San Francisco, Cal. — C. H. Grant Co.

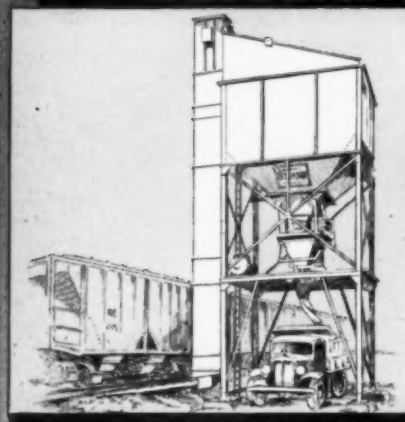
FASTER CONSTRUCTION



AGGREGATE BATCHING PLANTS



STEEL FORMS
FOR GENERAL CONCRETE CONSTRUCTION



BULK CEMENT PLANTS

That unbeatable combination of *correct design, rugged construction* and *assured performance* has made Blaw-Knox equipment first choice of construction men who have a reputation for getting things done in a hurry...You'll find this trouble-free equipment hard at work building roads, airports and general concrete construction all over the world.

You can depend on your nearest Blaw-Knox Distributor to handle your inquiry promptly and efficiently.

BLAW-KNOX

BLAW-KNOX DIVISION
OF BLAW-KNOX COMPANY
2086 FARMERS BANK BLDG., PITTSBURGH (22) PA.
New York • Chicago • Philadelphia • Birmingham • Washington
REPRESENTATIVES IN PRINCIPAL CITIES

KNOW YOUR BLAW-KNOX DISTRIBUTOR

NEW HAMPSHIRE
Barre, Vt. — Casellini-Venable Corp.
Boston, Mass. — The Equipment Co.
Portland, Me. — Stanley-Cadigan Co.

NEW JERSEY
New York, N. Y. — R. E. Brooks Company
Philadelphia, Pa. — Giles & Ransome

NEW MEXICO
Albuquerque — Hardin & Coggins

NEW YORK
Albany — Larkin Equipment Co.
Buffalo — Trevor Corporation
Elmira — LeValley, McLeod & Kinkaid
Endicott — Newing Motors Co., Inc.
New York — R. E. Brooks Company
Rochester — Keystone Builders Supply
Syracuse — Syracuse Lumber Co.
Utica — McQuade & Bannigan, Inc.

NORTH CAROLINA
Raleigh — Carolina Tractor & Equip Co.
Salisbury — Carolina Tractor & Equip Co.

NORTH DAKOTA
Fargo — Dakota Tractor & Equipment Co.

OHIO
Cleveland — H. B. Fuller Equipment Co.
Columbus — W. W. Williams Co

OKLAHOMA
Tulsa — Leland Equipment Co.

OREGON
Portland — Contractors Equipment Corp.

PENNSYLVANIA
Philadelphia — Giles & Ransome
Pittsburgh — Dravo-Doyle Company

RHODE ISLAND
Boston, Mass. — The Equipment Co.

SOUTH CAROLINA
Columbia — Jeff Hunt Road Machinery Co.

SOUTH DAKOTA
Rapid City — I. D. Evans Equip. Co.

TENNESSEE
Chattanooga — Nixon-Hasselle Co.
Knoxville — Wilson-Weesner-Wilkinson Co.
Nashville — Wilson-Weesner-Wilkinson Co.
Memphis — Road Bldrs. Equip. Co.

TEXAS
Dallas — Conley-Lott-Nichols Mach. Co.
Houston — R. B. Everett & Co.

UTAH
Salt Lake City — Lund Machinery Co.

VERMONT
Barre — Casellini-Venable Corp.

VIRGINIA
Richmond — Rish Equipment Co.
Roanoke — Rish Equipment Co.

WASHINGTON
Seattle — Star Machinery Co.
Spokane — Empire Equipment Company

WEST VIRGINIA
Charleston — Rish Equipment Co.
Clarksburg — Rish Equipment Co.

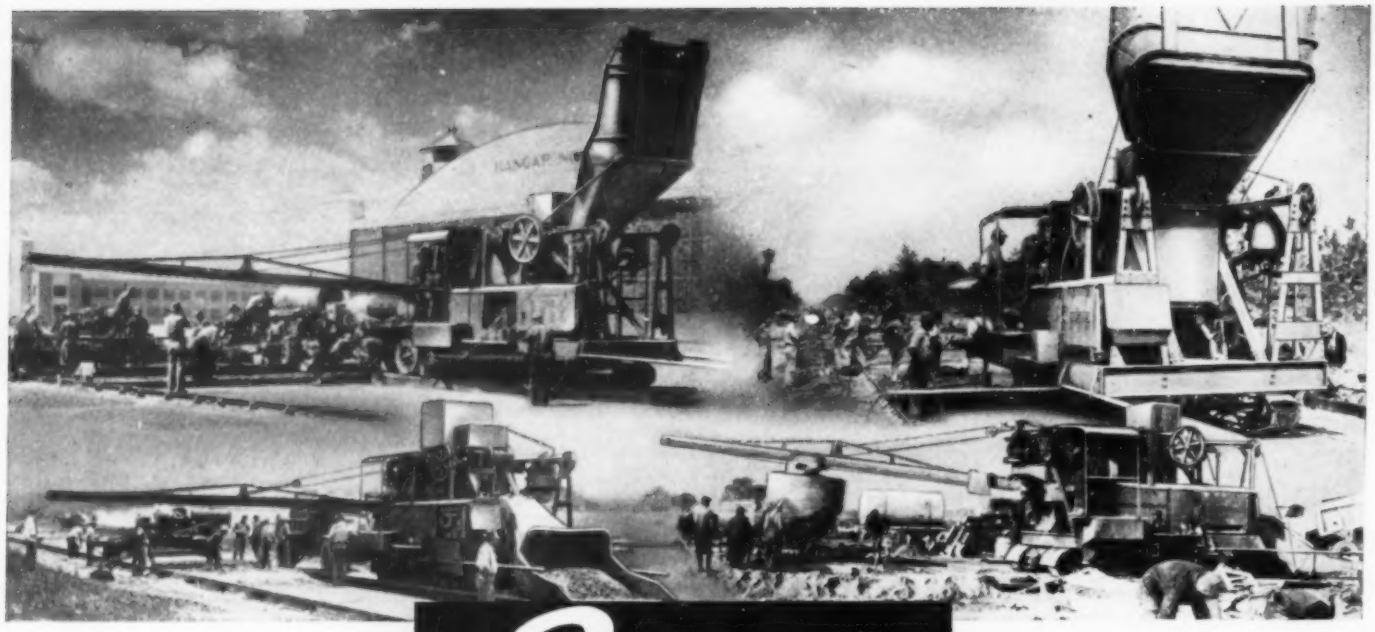
WISCONSIN
Milwaukee — Hunter Tractor & Mach. Co.

WYOMING
Billings, Mont. — Western Const. Equip. Co.
Denver, Colo. — Ray Corson Mach. Co.

ALASKA
Seattle, Wash. — Northern Commercial Co.

CANADA
Montreal — Watson Jack & Co., Ltd.
Toronto — W. L. Ballentine Co.
Vancouver, B. C. — B. C. Equip. Co., Ltd.
Winnipeg — Kane Tractor & Equip. Co.
Saskatoon — Richardson Road Mach. Co.

NEW FOUNDLAND
St. Johns — Dominion Distributors Co.



Ransome

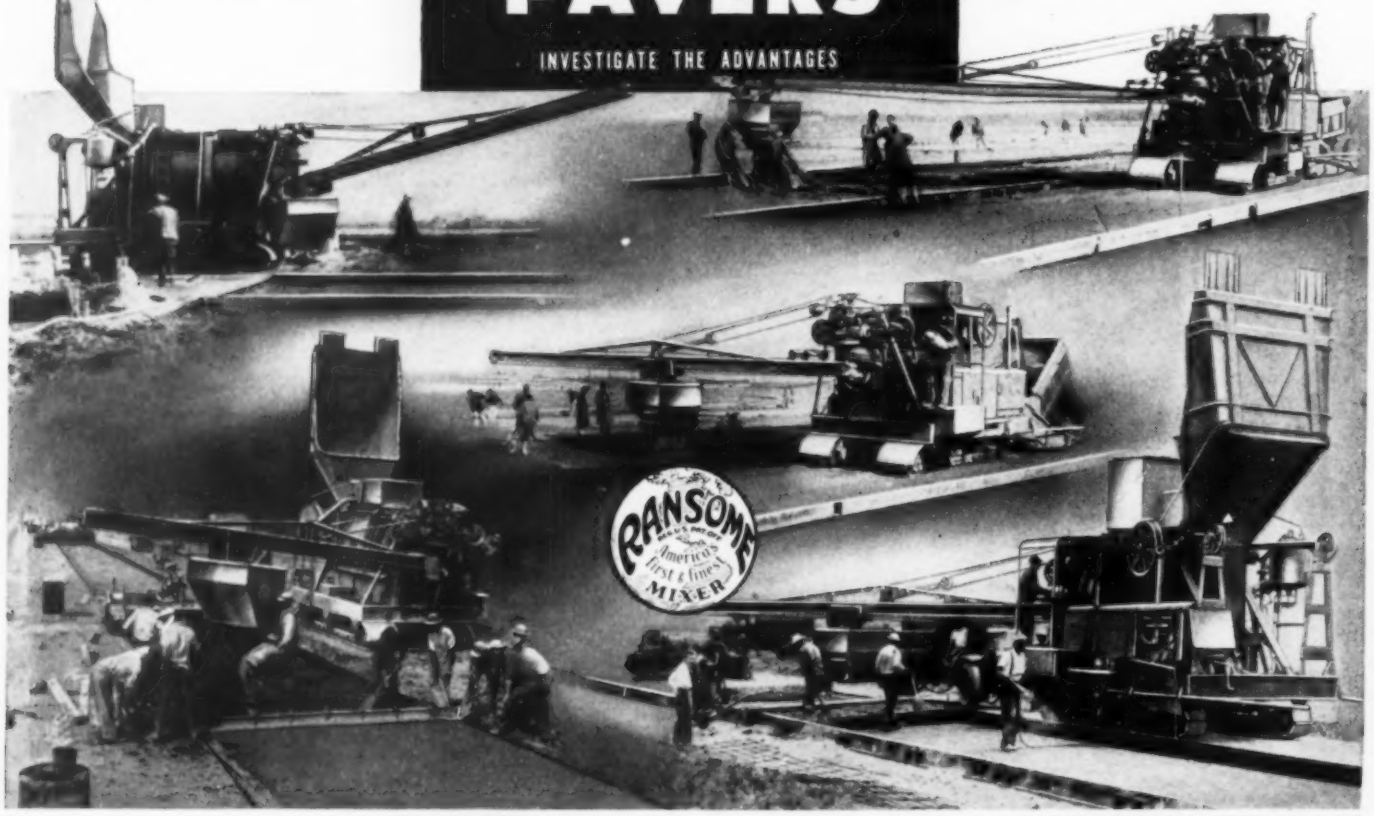
34E SINGLE AND DUAL DRUM PAVERS ARE THE ONLY

HYDRAULICALLY CONTROLLED

PAVERS

INVESTIGATE THE ADVANTAGES

The efficient hydraulic operating system on Ransome Pavers means sustained high speed, minimum loss of time and profitable operation . . . you swing and spread simultaneously. At construction joints, hydraulic operation of the bucket doors enables operator to deposit concrete on one side of joint, close doors and then place balance of batch wherever required. . . . . Normal operating cycle is unchanged. No more split batches — you discharge a full batch into bucket every time. In cold weather, hydraulic fluid is freeze-proof. On your next paving job, use a Ransome 34-E Paver.



CONSTRUCTION EQUIPMENT DIVISION Ransome MACHINERY COMPANY

DUNELLEN, NEW JERSEY

SUBSIDIARY OF WORTHINGTON PUMP AND MACHINERY CORPORATION

The War Showed the World A NEW CANVAS

Picture a more gruelling test for cotton duck, first cousin to gun cotton in burning qualities; subject to the same natural deterioration as any organic matter in the elements; victim of the virile mildew fungus.

Yet that same cotton duck has gone to war. Resisted every incendiary that the enemy could throw over; every deteriorating influence that the swamps of Guadalcanal, the deserts of North Africa, the bleak winds of Iceland and Russia, and the salt spray and tropical heat and rains of the South Pacific could muster.

But, of course, that cotton duck was FIRE CHIEF-treated Canvas — the original fire-, water-, weather- and mildew-resistant HOOPERWOOD "Engineered Canvas."

What does this triumph of "Canvas Engineering" hold for the post-war world? Many things, among which are: construction windbreaks that hot rivets or welding torches won't ignite . . . awnings that won't burn, mildew and rot . . . truck covers outlasting their predecessors several times over . . . ships' hatch covers and lifeboat covers that present no fire hazard . . . and many other superior canvas products.

If you are interested, write for new bulletin, "War Proved for Post-War Service."

WM. E. HOOPER & SONS CO.

New York **PHILADELPHIA** Chicago

Mills: WOODBERRY, BALTIMORE, MD.

Since 1800 (through six wars) the HOOPER name has symbolized highest quality in Cotton Duck and other Heavy Cotton Fabrics, Paper Mill Dryer Felts, Filter Cloth, Rope, Sash Cord.

• Fire-Chief Finished (PATENTED) •

HOOPERWOOD COTTON DUCK

Even on the simplest operations, fine hand tools pay big dividends — in speed, good workmanship, greater safety. On difficult operations they are indispensable. Everywhere in industry Snap-on tools are giving added efficiency to manpower in production, assembly and service operations. Snap-on's direct-to-user tool service is available through 37 factory branches located in key production centers.
Snap-on Tools
THE CHOICE OF BETTER MECHANICS

SNAP-ON TOOLS CORPORATION, 8084-J 28th Ave., Kenosha, Wisc.

(Continued from page 110)

for construction was made by specifying gypsum plank as the material for the roof of the big building.

Walls of Concrete Block

An outstanding feature of the project is the extensive use made of precast concrete block—390,000 masonry units—for the construction of two types of wall (exterior and interior and both load-bearing) specified for the postal building. Exterior walls are of the cavity type, with a total thickness of 14 in., consisting of 8 in. of cinder-concrete block on the inside, a 2-in. air space for purposes of insulation and watertightness and 4-in. buff-colored, sand-cement precast block for the finished exterior surface. Interior fire walls, dividing the structure into work areas, are of cinder-concrete block 12 in. thick, without surface finish. Between floor and roof the walls are 18-20 ft. high, not including an extension or parapet of about 3 ft. above roof level.

The two concrete block components of the cavity type, exterior wall are tied together mechanically by ¼-in.-diameter galvanized steel rods bent at the ends and bedded in the mortar between the blocks of the two sections of wall. These

(Continued on page 118)

NATIONAL GUNITE
Pressure - Packed
CONCRETE
has superior advantages:

Low water ratio assures density at all points—no voids, no bubbles or air pockets. . . . Waterproof—perfect steel protection. . . . Greater strength with less thickness . . . No waste of material. . . . Great savings in time.

Recommended for rebuilding or relining disintegrated concrete and steel as well as new work.

National Gunite is a coast-to-coast engineering organization with years of experience, supplemented by field crews of skilled Gunite operators.

Write, giving your requirements

NATIONAL GUNITE CORPORATION
420 Lexington Ave., New York 17, N. Y.
Boston—Washington

CLEVELAND CLAY AND TRENCH DIGGERS

Take it Out in a Hurry!

Model CD8
Weight, 22
Pounds

Model C10D
29 Pounds

★ For loosening up hard ground or tough clay, these tools are real time and money savers. There are four types to choose from—a good digger for every condition. Model CD8 is recommended for average work, for caisson jobs, wall trimming, and similar digging. The TD8, with the extension handle, is just right when the operator has a chance to stand erect in his work. C10D, with the spade handle, and the C10E long-handle digger, are for the tougher job.

Model TD8
26 Pounds

Model C10E
36 Pounds

Cleveland No. 5 Back Fill
Tamper weighs 30 lbs.
with butt.

CLEVELAND BACKFILL TAMPERS

Ram all the Dirt Back Firmly!

★ Whenever construction work or paving must proceed immediately after back-filling, Cleveland Tampers will prove to be the answer to your problem. They ram the earth even firmer than it was originally, making it safe for your job to go ahead. And you won't have any dirt to haul away!

Bulletin 128 provides full information on the Cleveland Line of Diggers and Tampers. Promptly sent on request.

BRANCH OFFICES

Birmingham, Ala.	Dallas, Texas	Los Angeles, Calif.	Salt Lake City, Utah
Boston, Mass.	Denver, Colo.	Milwaukee, Wis.	San Francisco, Calif.
Buffalo, N. Y.	Detroit, Mich.	New York, N. Y.	St. Louis, Mo.
Butte, Mont.	El Paso, Texas	Philadelphia, Pa.	Wallace, Idaho
Chicago, Ill.	Ironwood, Mich.	Pittsburgh, Pa.	Washington, D. C.
Cincinnati, Ohio	Lexington, Ky.	Richmond, Va.	

CANADIAN DISTRIBUTORS

Purves E. Ritchie & Son, Ltd., 658 Hornby Street, Vancouver, B. C.

Cleveland Rock Drill Factory People are buying regularly U. S. War Bonds and Stamps.

THE CLEVELAND ROCK DRILL COMPANY

Division of The Cleveland Pneumatic Tool Company

CLEVELAND 5, OHIO

(Continued from page 116)

ties are spaced horizontally on 2-ft. centers and every three courses vertically; they have V-shaped crimps at the midpoint of the 2-in. cavity, through which they extend, to prevent water which might seep through the exterior wall blocks from passing along the rods to the interior surface of the cinder-concrete block backing.

At points where the ends of the timber roof trusses are seated on the walls, piers of cinder concrete blocks are built as integral parts of the wall, protruding as bastions 1 ft. beyond the face of the wall, as illustrated in the accompanying photographs. These load-bearing piers are capped with a solid concrete block in which anchor bolts are embedded for holding the ends of the roof truss securely in place.

For the exterior and the dividing walls of the big building the chief problem of the designers was to find a non-critical material that could be supplied quickly in quantities sufficient for this exceptionally large structure and that could be installed rapidly. Precast concrete block seemed best suited to meet these requirements, and an order calling for the delivery of 390,000 blocks within a period

(Cntinued on page 120)

A LOT OF HITTING POWER IN COMPACT FORM

SUPER-VULCAN OPEN TYPE DIFFERENTIAL-ACTING PILE HAMMERS 18C, 30C, 50C and 80C

● In attempting to get pile driving done in the shortest number of hours and at the same time bring costs down it's the sure hard-hitting blows that count.

The Super - VULCAN is designed to be exceptionally compact yet it has exceptional hitting power to give you every advantage. From top to bottom there is built-in rugged strength.

The open type fits the same leads and uses the same accessories as the WARRINGTON VULCAN Single - Acting Pile Hammer.

Sizes 18C—30C—50C—80C meet all needs

VULCAN IRON WORKS Since 1852

331 North Bell Avenue

Chicago 12 ---Illinois

The latest from Washington

on the disposal of

U. S. GOV'T SURPLUS WAR PROPERTY

Billions of dollars worth of surplus goods of every description *including large quantities of machinery and machine tools,* must be disposed of by the government. Thousands of different items have already been sold. How? Through whom? What are the latest decisions on goods still to be sold? Keep currently informed, through the SURPLUS WAR PROPERTY NEWSLETTER—a Washington service dealing *exclusively* with this important subject. Privately issued each week.

Write for free current copy

Surplus War Property Newsletter

Vincent F. Callahan, *Editor*

Suite 404, 1701 H Street, N. W.,

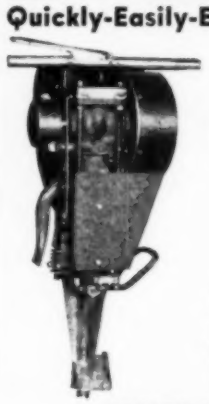
Washington 6, D. C.

SAVE MONEY, TIME and LABOR! with the new SYNTRON GASOLINE HAMMER PAVING BREAKER

A "heavy-duty" tool for—
Busting Concrete
Breaking Rock
Cutting Asphalt
Digging Shale — Tamping
and many other jobs.

100% Self-Contained
No Air Compressor and Hose
No Battery Box and Cable
No Springs

Quickly-Easily-Economically



POWER! POWER! POWER! to spare.

Portable

Low Fuel Consumption

Write for illustrated folder.

SYNTRON CO.

500 Lexington, Homer City, Pa.

IF IT'S A RODGERS IT'S THE BEST IN HYDRAULICS

"OUR RODGERS TAMED THAT BULLDOZER IN 4 HOURS FLAT!"

NO. 19 OF A
"READY-WITH-A-RODGERS" SERIES

"The first job our Rodgers Track Press did for us opened our eyes. It was on a bulldozer that needed new track bushings—a job that used to take at least a couple of days.

"In four hours flat, that bulldozer was all fixed up snug and tight with new pins and bushings, ready to go to work. We don't mind track repairs any more—our Rodgers takes 'em all in stride."

This experience is typical—maintenance men agree that the Rodgers Track Press shortens layups for tractor repairs—saves time and money. It will pay you to get the full story on the Rodgers Track Press . . . write or wire for complete information and prices. *If it's a Rodgers, it's the best in hydraulics.* Rodgers Hydraulic, Inc., Dept. D-10, St. Louis Park, Minneapolis 16, Minnesota.

RODGERS HYDRAULIC, Inc.

HERE'S HOW
Your Insley Dealer
Can Help!
There is no immediate prospect of new Insley Excavators for civilian users. Insley is building cranes and similar material handling equipment . . . and this class of machinery now ranks high on the "critical" list.
In view of this situation, we suggest the only possible alternative: Do your very best to make present equipment "see you through."
If such equipment includes Insley Excavators, your Insley dealer can be a great help in keeping them in first-rate operating condition. See him today about your Insley maintenance and service program . . . and about those new and improved Insley Excavators that await you tomorrow.
EXCAVATORS • CRANES • BUCKETS • CARTS
INSLEY
CONCRETE PLACING EQUIPMENT
INSLEY MANUFACTURING CORPORATION
INDIANAPOLIS 1, INDIANA.

(Continued from page 118)

of about 6 weeks was placed with the National Brick Corp., of Long Island City. The job progress schedule allowed only 55 days for the erection of the walls of the Postal Concentration Center. Concrete block deliveries were called for at the rate of about 65,000 per week.

For the most part, only three sizes of concrete block are required for the walls and built-in piers supporting the roof trusses. For the 12-in. thick interior walls the blocks measure 12x8x16 in. and are cast with three hollow cells or cores per block. Each block, weighing 43 lb., is rated for purposes of laying by masons, as a one-man block. For the back-up portion of the exterior, cavity-type walls, the cinder concrete blocks, each with three hollow cores, measure 8x8x18 in. and weigh 30 lb. The buff-colored outside facing block of the cavity wall is of sand (not cinder) and cement; it measures 4x8x18 in. and weighs 26 lb. In addition to the foregoing sizes, 6x8x18-in. and 4x8x18-in. block was used for partition walls and other miscellaneous purposes.

Block Construction

The concrete for the blocks was made with air-entraining cement in order to increase plasticity, cohesion and workability of the mix, and produce a stronger, more durable block highly resistant to breakage and weathering. With air-entraining cement, because of the cohesiveness of the mix produced, it is found possible to increase the water content of the rather dry mixtures commonly used in the machine-molding of concrete block, and thus, with a more workable mix, facilitate the casting process.

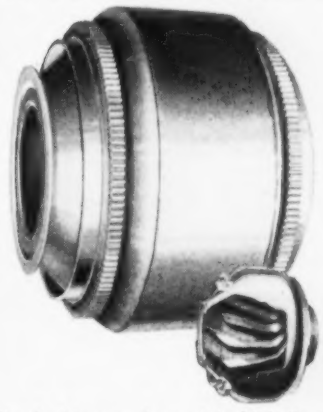
The cinder-concrete block are cast in Besser machines and consist of a mix of 1 part Portland cement and 8 parts clean cinders. After being molded they are subjected to accelerated curing in autoclaves under a steam pressure of from 120-150 lb. per sq. in. and a temperature of 385 deg. F. The blocks are steam-cured for a period of 8 hr. and are then removed and allowed to cool for 3-4 hr. At this stage the blocks develop a compressive strength of at least 1,000 lb. per sq. in. and are ready for shipment to the job site. Because of the large number of blocks required in such a short time, as above noted, it would not have been possible for the manufacturing plant to have met deliveries without cutting down on production time through the use of the accelerated steam curing process. Other advantages re-

(Continued on page 122)

Pave your way to POSTWAR PROSPERITY

with MultiFoote Pavers

HERE'S THE SECRET of BETTER MIXING!



The double cone drum of the MultiFoote Paver gives end-to-end scouring action that insures a complete and thorough mix of every batch. There are no sharp angle corners where the mix can adhere and build up and be hard to clean. Openings are fitted with renewable wearing rings. Cutaway section shows drum interior and blade design.

YOUR share of the three billion dollar annual postwar highway construction program will be more profitable if you have the combination of features provided by MultiFoote Pavers for speeding up production. Their records for speed and low cost paving of highways and airports everywhere are the reasons why there are more MultiFoote Pavers in service than any other make.

The big, wide, solid skip, which can take the battering of any batch truck, assures positive, fast charging without spilling. Double cone drum provides complete and thorough mix of every batch. Water system is simple, accurate and independent of water pressure. Rotary discharge takes only a quarter turn to kick concrete into the big bucket ready to speed out the long boom to be discharged. High operating platform permits greater visibility and faster, more accurate work.

Write for details or see your local MultiFoote dealer.

THE FOOTE COMPANY, INC.

NUNDA • NEW YORK

The World's Largest Exclusive Manufacturers of Concrete and Black Top Pavers

MultiFoote Pavers Conform to A. G. C. Standards and Specifications

ARMY E NAVY

MULTIFOOTE

CONCRETE PAVERS

ADNUN BLACK TOP PAVER

1.
You Get the Strength of a 13 Gauge Shovel with Only 15 Gauge Average Weight.

2.
Resists Wear as Well as Breakage

The thicker center extends to the cutting edge where it retards wear-back.

3.
Permits Deeper Hang, Better Balance

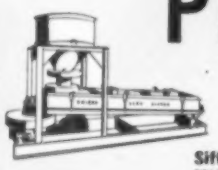
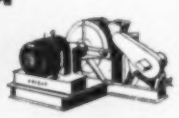
Thicker socket allows deep bend: load is centered.

THE UNION FORK & HOE COMPANY
652 Hocking Street, Columbus 15, Ohio

RAZOR-BACK SHOVELS
(THE ORIGINAL TUBULAR SHANK TYPE)

Also Stone, Ballast, Industrial Forks, Asphalt and Road Rakes; Distributors Everywhere.

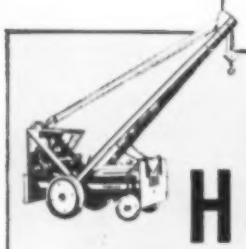
Materials
PROCESSING EQUIPMENT

Sifters, Crushers, Cutters, Dry and Liquid Mixers, Mills, Grinders, Pulverizers, Conveyor Systems, Complete Installations.

The handling equipment construction "know-how" of the Mercer Engineering Works, Inc., Clifton, N. J. . . . The more than 40 years processing equipment experience of Robinson Mfg. Co., Muncy, Pa. . . . All are embodied in and represented by

MERCER-ROBINSON, CO., INC.
30 CHURCH ST., NEW YORK 7, N. Y.



Materials
HANDLING EQUIPMENT

Trailer Trucks (All Types) Wheel Tractor Cranes (3 to 7 ton) Fork Lift Trucks, Lift Platforms, Hoists, Live Skids, Wheels, Casters.

(Continued from page 120)

sulting from high-pressure steam curing are reduction of shrinkage and lowering of weight of the finished block.

The buff-colored 4-in. exterior wall facing block was made of a mix of 1 part Portland cement and 8 parts sand and gravel (40 per cent sand and 60 per cent gravel). It was molded and steam-cured by the same process employed for the cinder-concrete block.

All block were laid up in a mortar consisting of 1 part Portland cement, 1 part hydrated lime and 6 parts sand. The blocks were delivered to masons, working on scaffolds, by inclined conveyor or by a hod-hoist on which rubber-tired wheelbarrows each loaded with four concrete blocks, were carried.

At points where the concrete block walls intersect, expansion joints 1 in. wide, sealed with Celotex premolded bituminous fiber filler, similar to that used in joints of concrete pavement slabs, are employed. To provide for settlement of the earth subgrade, slip joints are introduced between walls and floor slabs.

Prefabricated Timber Trusses

One of the largest and most important functional operations involved in building the Army post office was the prefabrication and erection of 943 timber roof trusses, most of them with a span of 32 ft. between supports, either on wood columns or on the load-bearing concrete-block walls of the structure. These trusses are made continuous between the five 32-ft. bays constituting the 160-ft. widths, between dividing walls, of the work areas of the building. The trusses are made of West Coast lumber, mostly Douglas fir, obtained on special priority by the Army Engineers and supplied to the John A. Johnson Contracting Corp. Bottom chord members are two 2x10's, top chords, two 3x10's; diagonals, pairs of 3x10's, 3x8's and 3x6's, and posts, 3x8's and 3x10's. The trusses are 5 ft. deep. Joints are made with the aid of Teco timber connectors. Each 160-ft. bay of the building is spanned by five continuous trusses carried by four intermediate wood columns and by the concrete-block walls at each end.

Since the trusses are designed to carry comparatively light loads (roof and snow load) it was decided to simplify fabrication operations and reduce the numbers of timber members to be connected at certain joints by having the truss diagonals for each half of a 160-ft. bay run in one direction only. Monitors and wood columns were fabricated and erected as integral parts of the trusses. The columns are of laminated construction, consisting of three 3x10's bolted together and held securely in place

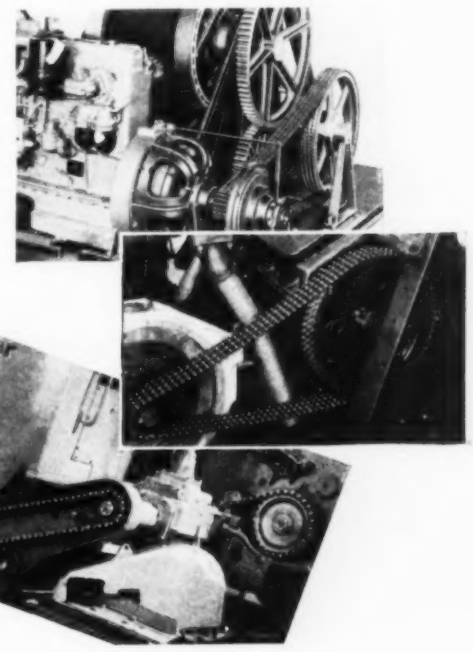
(Continued on page 126)

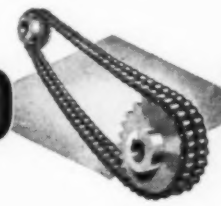
History Will Reveal the Tremendous Part Played by Construction Machinery in Winning the War

From every front all over the globe come reports of the vital part construction machinery is taking. Top men of the Armed Forces rate them with planes, tanks, artillery and ships in helping win the war.

The performance of the DIAMOND Roller Chains used by leading builders of construction machinery—operating far from home in every clime well bears out the established reputation for great reserve strength, dependability, long life and high power transmission efficiency.

When Victory comes construction machinery makers, contractors and operators will be ready to take on the big job of building America to greater heights than ever before, and—you'll find it as important as ever to see that your machinery is DIAMOND Roller Chain equipped . . . DIAMOND CHAIN & MFG. CO., 418 Kentucky Avenue, Indianapolis 7, Indiana. Offices and Distributors in All Principal Cities.



DIAMOND  **ROLLER CHAINS**

ATLAS MANASITE DETONATORS

This EXTRA SAFETY is *Imperative* Today!

The handling of explosives is a job that must always be done carefully. Today's often inexperienced labor makes it imperative that every last man on the blasting job be given every last measure of protection.

Atlas Manasite detonators, built to withstand greater impact and friction, are putting EXTRA SAFETY on blasting jobs everywhere. In addition, Atlas Manasite detonators are so effective as a blasting tool, so reliable in action, that millions and *millions* have been used since their introduction only five years ago.

You get this added safety at no extra cost. Let our representative give you ALL the facts.

Manasite: Reg. U. S. Pat. Off.

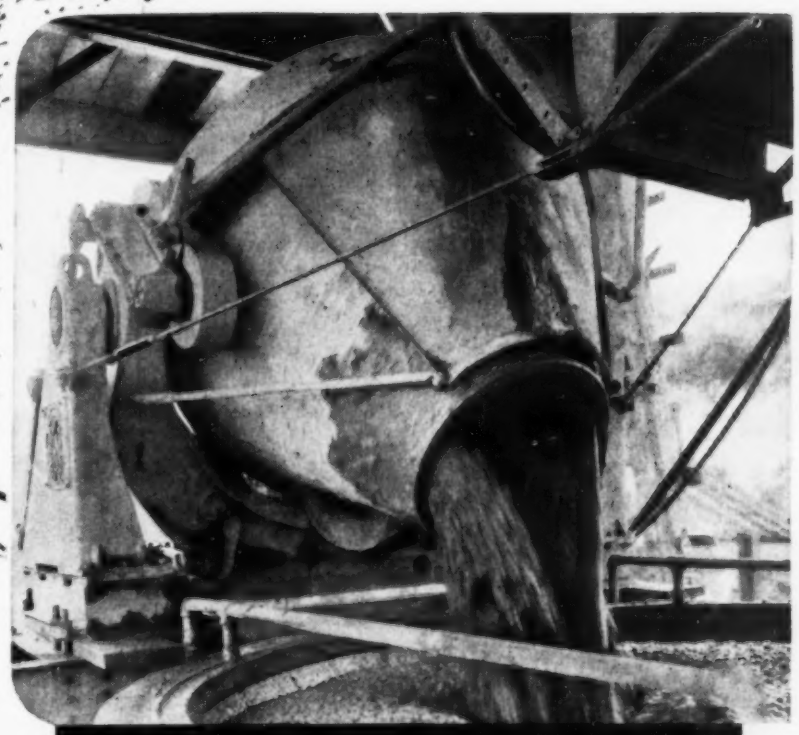
ATLAS EXPLOSIVES

"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • *Offices in principal cities* • *Cable Address—Atpowco*

QUALITY CONCRETE AT RECORD SPEED



DEPEND ON YOUR KOEHRING DISTRIBUTOR to help you keep your equipment operating. Care for your Koehring equipment NOW, so it will serve you tomorrow. Koehring distributors have genuine Koehring parts. Koehring parts warehouses are at your service.

RECORD POURING WITH KOEHRING

Koehring Tilting and Non-Tilting Mixers have established pouring records on many large volume concrete jobs . . . dams, spillways, locks, bridges, power plants, drydocks, etc. for both peace and wartime projects. Koehring Construction Mixers have specially designed non-clogging drums and drum interiors to produce thoroughly mixed, quality concrete. They are substantially constructed to operate day and night continuously for maximum yardage production. *Plan now* for a Koehring Mixer for postwar construction. Consult our distributor or write to us for information.

KOEHRING COMPANY
Milwaukee 10, Wisconsin

KOEHRING HEAVY DUTY

ARMY E NAVY

Member Mixer Bureau Affiliated with A. G. C.

HEAVY-DUTY CONSTRUCTION EQUIPMENT

(Continued from page 122)

by bolts through angle irons anchored to the concrete piers. Details of the timber trusses are shown in an accompanying drawing.

Lumber Mill

All of the timber trusses were prefabricated on the site. The contractor set up a lumber mill, comprising five long benches equipped with electrically powered tools for cutting, boring and routing the truss members by assembly-line methods. The benches were fitted with the necessary jigs to position each timber for the successive operations of cutoff to proper length, boring at correct points to provide bolt holes for truss assembly and, finally, routing out circular grooves around bolt holes to receive the split-ring connectors employed to develop joints of maximum strength.

The electrically-powered tools mounted in line along the several work benches at the sawmill included De Walt, Monarch and Walker-Turner circular saws carried on radial arms and adjustable for both right-angle and bevel cuts; drills of Skilsaw and Black & Decker make, mounted vertically in arbors and fitted

(Continued on page 128)

THIS IS THE PUNISHMENT

SISALKRAFT

IS TAKING IN WAR SERVICE!

PUT SISALKRAFT FIRST ON YOUR POSTWAR LIST!

Normally used for concrete curing, SISALKRAFT is protecting deckloads of war supplies exposed to arctic ice and tropical humidity — to sleet, snow, rain, wind and dirt!

Can you think of a more severe test than this direct exposure to the elements and the rough, hurried handling that war supplies must take?

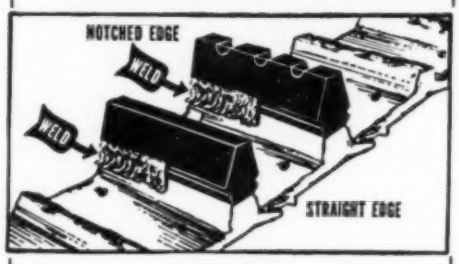
Those very same properties that enable SISALKRAFT to protect war supplies are the ones you need for protecting newly poured concrete from rapid evaporation and from damage by frost, drip and debris.

Put SISALKRAFT *first* on your postwar list — for concrete curing and general job protection. Its low cost, long life and outstanding performance are a record of nearly 25 years of satisfactory service.

THE SISALKRAFT CO. 205 W. WACKER DRIVE · CHICAGO 6, ILL. NEW YORK · SAN FRANCISCO · LONDON · SYDNEY

Manufacturers of SISALKRAFT, FIBREEN, SISAL-X, SISALTAPE AND COPPER-ARMORED SISALKRAFT

Rebuild your TRACTOR GROUSERS WITH BULLDOG Grip-Lugs



Easily Welded

OTHER PRODUCTS
TRAK-LINK RE-NU PLATES
MANGO BARS FOR REPOINTING DIGGER TEETH
EXCELLOY OVERLAY METAL

SEND FOR FOLDER CM

ALLIED STEEL PRODUCTS, INC.
NBC Bldg. Cleveland, Ohio

Enlarged reproduction free on request

Squeeze

YOU CAN HELP SQUEEZE THE AXIS

Proper selection, application and usage will make wire rope last longer, thus making more of it available for vital war needs. Let us send you a copy of "Know Your Ropes"—an 82 page book filled with illustrations, diagrams, charts and helpful suggestions for lengthening rope life.

SEND FOR YOUR FREE COPY

The United Nations are putting the squeeze on the Axis. Stout steel muscles of Wickwire Rope are doing everything they can to apply the pressure.

How? In forests, mines, oil fields and shipyards the strong, flexible muscles of Wickwire Rope are helping produce supplies for our fighting forces. And our men abroad will tell you that wire rope helps clear the roads and speed supplies to hasten destruction of Axis strongholds.

Wickwire Spencer has spent over 123 years making the wire that is the "muscle" of Wickwire Rope and WISSCOLAY Preformed. During that time Wickwire Spencer engineers have pioneered many important advances and have built a reputation for high, dependable quality that we aim to continue. If you have a wire rope problem we will be happy to be of service.

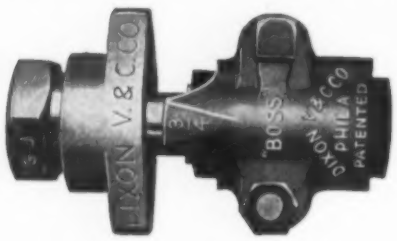
Send your wire rope questions to:

WICKWIRE SPENCER STEEL COMPANY

500 FIFTH AVENUE, NEW YORK 18, N. Y.

Abilene · Buffalo · Chattanooga · Chicago · Detroit · Houston · Los Angeles · Philadelphia · San Francisco · Tulsa · Worcester

ROCK DRILLING *With* "G J-BOSS"



GROUND JOINT

AIR HAMMER COUPLINGS

Rock drilling and other heavy-duty pneumatic tool service goes *faster*, with the greatest possible assurance of safety and freedom from interruptions, when "G J-BOSS" Air Hammer Couplings are used. Designed and built to assure maximum strength, durability and efficiency. Ground Joint construction provides soft-to-hard metal seal that will not leak, and eliminates time and trouble required for washer replacements. "Boss" Interlocking Clamp exerts a powerful grip that is proof against blowoffs.

Compact Type, Style XLB-61, ½" and ¾". Heavy Type, Style XHB-72, ¾" and 1".

NOTE: For washer type couplings of otherwise identical design, specify "BOSS" Air Hammer Couplings—Compact Type, Style WLB-21, ½" and ¾"—Heavy Type, Style WHB-32, ¾" and 1".

Stocked by Manufacturers and Jobbers of Mechanical Rubber Goods

DIXON
VALVE & COUPLING CO.
Main Office and Factory: PHILADELPHIA, PA.
BRANCHES: CHICAGO · BIRMINGHAM · LOS ANGELES · HOUSTON

(*Continued from page* 126)

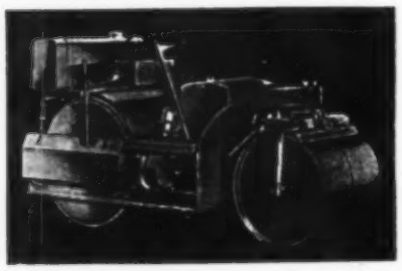
with wood-boring auger bits for cutting bolt holes; and other similar drills mounted vertically and fitted with routing heads to cut the circular grooves for the timber connectors.

From the lumber mill the timbers, successively cut, bored and routed, were transferred to assembly areas on the building site and fabricated into trusses with bolted connections. The truss assembly includes a monitor for each 32-ft. span and the necessary laminated wood columns to support the trusses between walls.

To insure maximum speed in truss erection with Lorain crawler cranes having 75-ft. booms, the Johnson company assembled the trusses for the 160-ft. widths of the work areas of the building in two approximate halves; one of these truss sections was 88 ft. long, with three monitor frames and three columns, and the other was 72 ft. long, with two monitor frames and one column. After being hoisted into place, the two sections were joined by a field splice near the center to form a continuous truss 160 ft. long. Much time in erection was saved by prefabricating each truss section for han-

(*Continued on page* 132)

C.H.&E.
3 Ton Roller

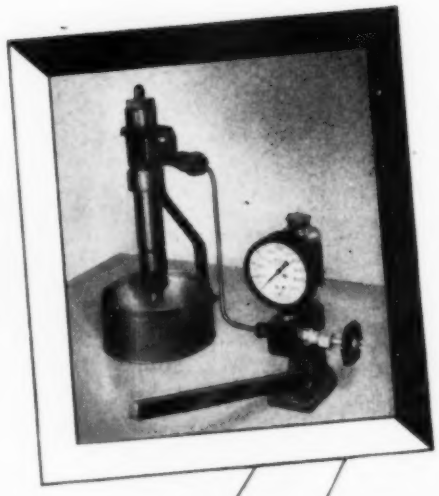


For rolling footpaths, driveways, sidewalks, tennis courts, playgrounds, and general maintenance work. The forward and reverse speed is controlled by one hand lever. Both front and rear rolls can be filled with water. Easy to load on a truck for transportation from job to job.

We also manufacture Saw Rigs — Pumps — Hoists — Bar Cutters and benders.

Write for catalog.

C. H. & E. Manufacturing Co.
3847 No. Palmer St.
Milwaukee 12, Wis.



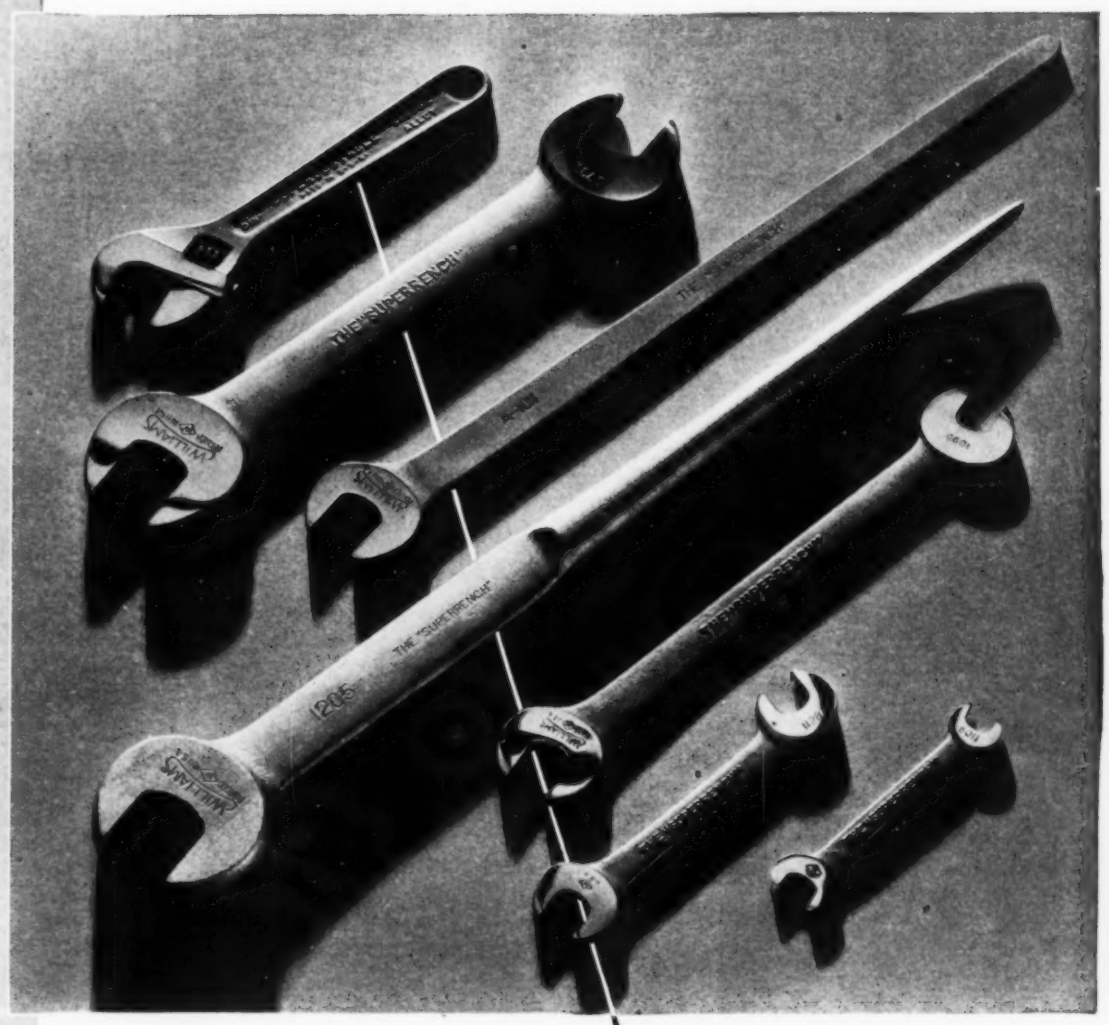
ADECO
NOZZLE TESTER

KEEP DIESEL ENGINES RUNNING AT PEAK EFFICIENCY

With this sturdy, portable, lightweight Adeco Nozzle Tester, any mechanic can easily make quick, accurate tests on injector opening pressure, spray pattern, etc. and detect stuck needle valves and leakage around valve seats. Adeco advantages have made this America's most widely used nozzle tester. Tests both large and small injectors, on bench or engine. Avoids costly delays and possible damage to engine. Keeps diesels operating at peak efficiency.

Write for new illustrated bulletin.

ADECO
AIRCRAFT & DIESEL EQUIPMENT CORPORATION
4401 NORTH RAVENSWOOD AVENUE
CHICAGO 40, ILLINOIS



That industry may compete

The same tools that help win wars will lend new skill to the creative hand of postwar industry. Tomorrow these tools will produce those wanted things which a strife-weary world has long gone without . . . and produce them at less cost that more may enjoy them.

J. H. WILLIAMS & CO.,
Buffalo 7, N. Y.

WILLIAMS
DROP-FORGINGS AND DROP-FORGED TOOLS

Now— the story of U. S. war construction in foreign lands

Eyewitness accounts of thrilling engineering exploits in the face of wartime obstacles and in battle-ridden locales.

U. S. Marine Corps Photo

Just Published

BULLDOZERS COME FIRST

278 pages, illustrated by photos, chiefly taken by the authors, $2.75

By

WALDO G. BOWMAN
HAROLD W. RICHARDSON
EDWARD J. CLEARY
ARCHIE N. CARTER
NATHAN A. BOWERS

Members of the editorial staff of Engineering News-Record, who as accredited war correspondents traveled over 100,000 miles to view the war construction operations graphically reported in this book.

HERE is the prosaic bulldozer in a new role—as spectacular a factor in the war as the tank, the jeep, or the bomber, preceding the fighting forces where that was possible, and accompanying them, even in the first wave of attack, when that was necessary.

Some three dozen stories are given, covering the accomplishments of Army Engineers, Navy Seabees, and hardy civilian engineers and contractors, as witnessed by five members of the editorial staff of *Engineering News-Record* while serving as war correspondents.

Nearly every theater of the war is represented in varied stories that show the bulldozer going ashore with early waves of landing troops, repairing airfields, clearing up wrecked ports, building desert, mountain, and jungle roads, establishing depots and fortifications, even fighting if need be, in a specialized type of reporting that helps to explain why this has been called "an engineer's war."

Partial list of contents:

Bases for Bombing from Britain
The African Construction Front
Beating a Path to Russia's Back Door
Roadbuilding in a Hot Spot
Good Water and Bad Mosquitoes
Battle of Engineer Hill
Journey to Attu
Building with Sky Hooks
Bridges on the Alcan
Engineers Transform the Jungle
Land Link to Panama
Airfields of Pacific Coral
Steel Pontoon Cells in the South Seas
Landing Heavy Equipment on Hostile Shores

See one of the first copies off press

10 days' examination—Send this McGRAW-HILL coupon

McGraw-Hill Book Company, Inc., 330 W. 42nd St., New York 18, N. Y.

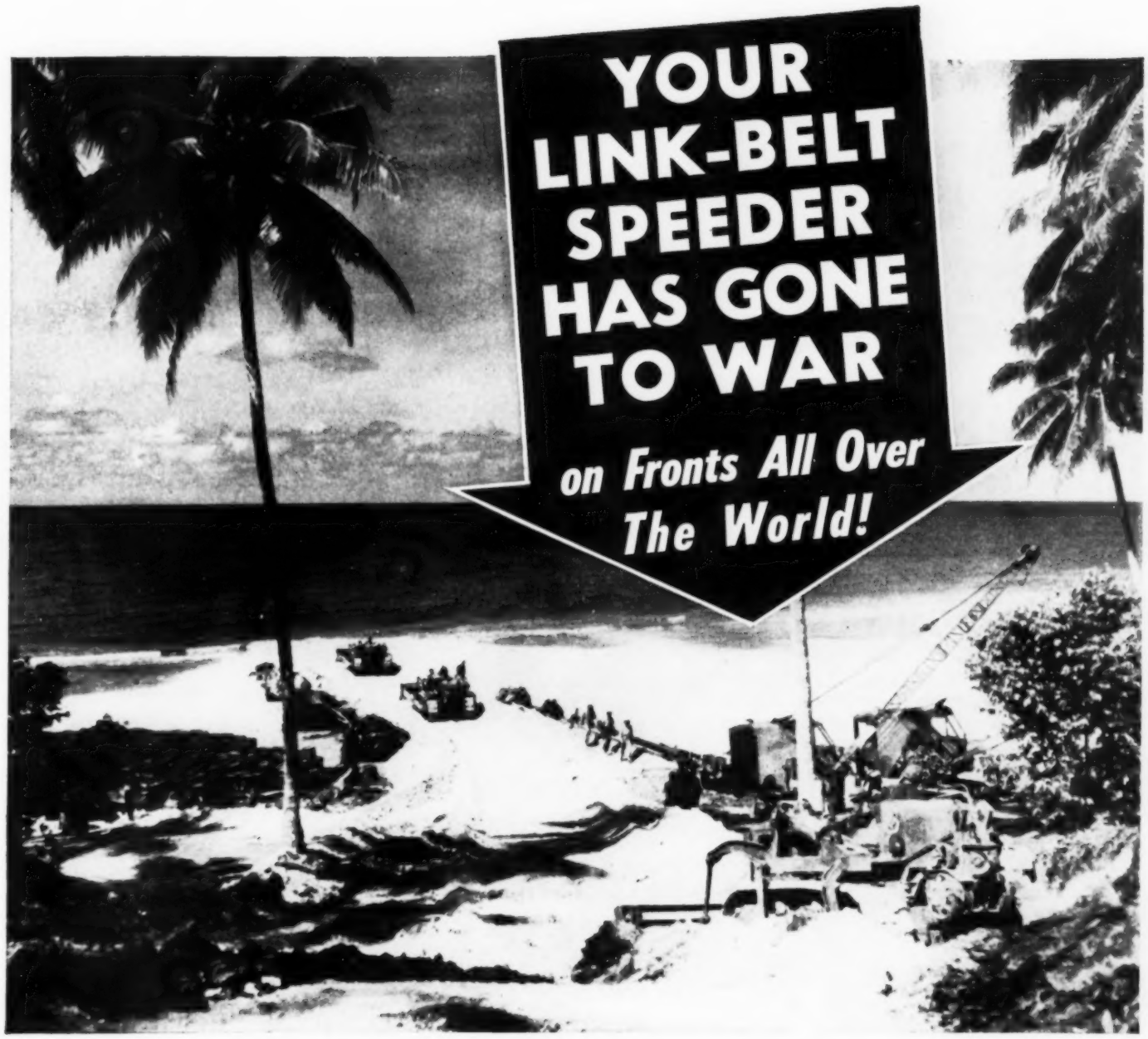
Send me Bowman, Bowers, Richardson, Cleary and Carter's Bulldozers Come First for 10 days examination on approval. In 10 days I will send $2.75, plus few cents postage, or return book postpaid. (Postage paid on cash orders.)

Name .....

Address ..... Position .....

City and State..... Company CM-10-44

(Books sent on approval in U. S. only.)



• These easy-to-handle, rugged machines can be found on battle fronts all over the globe. Construction battalions everywhere are using them to build landing strips, lay road beds and perform the dozens of other tasks that must be done in order to secure captured territories for further attack on the enemy!

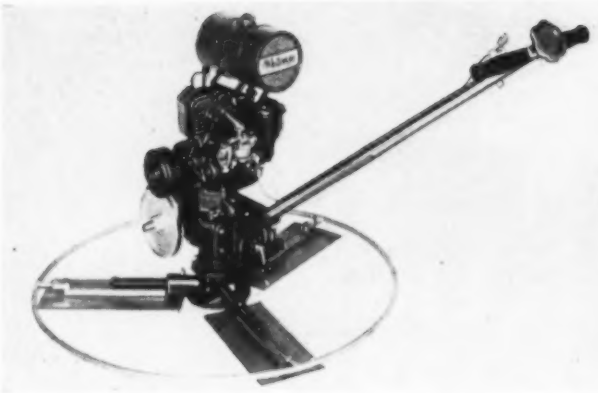
9692

LINK-BELT SPEEDER

LINK-BELT SPEEDER CORPORATION, 301 W. PERSHING ROAD, CHICAGO 9, ILL.
(A DIVISION OF LINK-BELT COMPANY)

WHITEMAN
MODEL "J"
Concrete Finishing Machine
for fast work in small spaces.

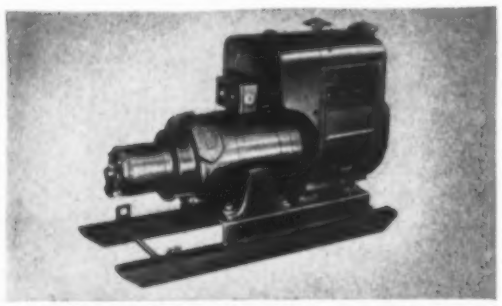
- **Lightweight**
- **Easy to operate**
- **Low cost**
- **Covers 1000 sq. ft. in 15 minutes**



MODEL "J" Concrete Floating and Finishing Machine cuts costs, increases profits on small jobs. Easily carried, weighs only 105 lbs. This light weight also permits earlier start on floating operation, cutting slab finishing time.

Write or wire for performance data and name of nearest distributor.

Whiteman MANUFACTURING CO.
3249 Casitas Avenue — Los Angeles 26, California



MASTER GAS-ELECTRIC GENERATING PLANTS

COMPACT PORTABLE

SAVE TIME AND SPEED WORK WHEREVER POWER OR LIGHTING IS REQUIRED

Eleven basic sizes from 500 watts to 17,000 watts and 30 different types to meet all AC or DC power or lighting requirements. Housed or open models . . . available with wheelbarrow, buggy or trailer mounting. For operating a single tool or motor, or floodlight . . . or gangs of tools, groups of motors, or lighting entire areas. Easy to put in operation . . . economical to operate and maintain. Compact, portable, self-contained.

For complete details write for Bulletin 594.

MASTER VIBRATOR COMPANY
Dayton 1, Ohio • Distributors throughout United States and Canada
Products Include: Concrete Vibrators Gas or Electric Surfacing Attachments, High Speed Tools • Vibratory Concrete Finishing Screeds • Rotary Concrete Floor Finishing Machines • Portable Gas Electric Generator Plants, 500 Watt to 17000 Watt, Voltage Regulators and Portable Mountings Optional • Master Flood and Shovel Lights • Electric or Gas Engine Driven Power Blow Hammers

(Continued from page 128)

dling by the cranes as a complete unit, including its monitor frames and wood columns. As fast as the trusses were set in place, carpenter crews nailed in place 2x10-in. rafters, spaced 2 ft. on centers, to bridge the 16-ft. gap between successive trusses and support the roof covering.

Gypsum Plank Roof

With a full realization of the current lumber shortage the designers made a substantial saving in this war-critical building material by specifying gypsum plank for the roof covering. Supplied largely by the National Gypsum Co., and also by the U. S. Gypsum Co., the roof planks are of 3-ply construction, 1½ in. thick, and are mill-precut to speed laying on the job. The planks have a standard width of 2 ft. and lengths up to 10 ft. to fit roof requirements. The gypsum planks are surfaced on top with a single ply of tarred felt. After the planks are laid with shiplap joints and nailed to the rafters they are covered by a layer of Bird 2-ply felt board insulation, 1 in. thick. This insulation is supplied in 2x4-ft. panels. On top of the insulation is finally applied a Barrett built-up roof surface.

Concrete Floor

The immense floor area of the Postal Concentration Center, covering about 630,000 sq. ft., is covered with a 5-in. thickness of concrete reinforced with 6x6 in. No. 10 gage American welded steel wire mesh and topped off with a ⅝-in. thickness of Kompocrete, an asphalt mix producing a resilient surface designed to provide foot comfort for the thousands of postal workers who will operate the post office. Concrete for the floor is poured in strips about 10 ft. wide from chutes on the ends of truck-mixers. It is brought to finished grade by hand screeds riding on the tops of T-irons carried by notched stakes driven into the subgrade. Concrete is placed in two pours, the first about 3½ in. thick, over which the wire mesh reinforcement is rolled, and, finally, the top 1½ in.

As soon as the concrete floor slab has hardened the resilient Kompocrete surface finish is applied. This material consists of an asphalt emulsion, sand, grit and a setting compound. It is mixed, cold, in a Kwik-Mix open-trough, paddle-type mixer and delivered to place in rubber-tired buggies. The concrete slab is first primed with an adhesive cutback asphalt emulsion over which the ⅝-in. thickness of asphaltic floor finish is applied, screeded and brought to a smooth, compact surface by a Kelley electrically powered rotating floor float.

Work on the post-office building was

(Continued on page 134)

EQUIPMENT OLDER AND

NO TIME FOR BREAKDOWNS

IS THAT YOUR PROBLEM? Then investigate Socony-Vacuum's Delvac Oils. They give you far cleaner, safer engines than is possible with older-type oils . . . Resist formation of sludge, "varnish," "lacquer"...guard against corrosion of hard-alloy bearings. Mean fewer engine cleanings—FEWER DELAYS ON THE JOB! Recommended for all automotive-type Diesels and heavy-duty gasoline engines! They'll save time for you.

OTHER SOCONY-VACUUM TIME-SAVERS:

MOBILUBE GEAR OILS—Made specially for heavy-duty service, these highly stable, straight mineral gear oils are free of abrasives, soaps, fillers, all foreign material. Will not thicken excessively when cold. Safeguard gears against "scuffing"—wear—costly breakdowns.

MOBILUBE "V"—A special, short-fiber, soda soap grease developed for year-round use in wheel bearings and grease-type universal joints. Also recommended for protection of clutch release bearings and other automotive parts operating at high temperatures. Unusually efficient and long-lasting!

Talk with your Socony-Vacuum Representative

Mobilgas
SOCONY-VACUUM

USE SOCONY-VACUUM FUELS, LUBRICANTS, AND ENGINEERING SERVICE!

KEEP ENGINES "ON SCHEDULE" WITH SOCONY-VACUUM'S FAMOUS

DELVAC *Heavy-Duty* OILS

SOCONY-VACUUM OIL CO., INC., and Affiliates: Magnolia Petroleum Co., General Petroleum Corp. of Calif.

(Continued from page 132)

carried on by two 10-hr. shifts, 7 days a week. The John A. Johnson Contracting Corp. payroll totalled about 700 men, while the various sub-contractors on plumbing, grading, roofing, duct installation, concreting and floor surfacing employed an additional 300 workers.

Personnel

The Postal Concentration Center in Long Island City, N. Y., was built under the direction of the U. S. District Engineer Office of New York, of which Col. Edgar W. Garbisch is district engineer, Lt. Col. Charles K. Panish, chief, engineer division; Lt. Col. David F. Fisher, chief of operations; Major C. A. Ripperger, in charge of construction; Walter H. Weiskopf, head engineer, and Paul A. Kelly, principal engineer. Resident engineer on the job for the Engineer Department was Peter F. Florence. Architect-engineers for the project were Alfred Hopkins & Associates, of New York, for whom Clarence B. Litchfield and Lester LaPierre are senior partners and Fred N. Severud, structural engineer. Clark, MacMullen & Riley were the mechanical engineers.

The John A. Johnson Contracting Corp. of Brooklyn, N. Y., contractor on the superstructure, is headed by John A. F. Johnson, president, and Edwin Johnson,

(Continued on page 136)

"greatest little 'cold-stoppers' in the world... DIXIE CUPS"

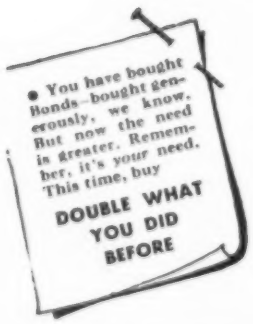
Of course Dixie Cups won't stop colds once started. But they can help prevent their being passed along to others.

That fact becomes doubly important on contract work where help shortage may prove serious. Use of Dixie or Vortex Cups helps prevent the spread of contagious illnesses that cause sick absenteeism.

Valuable time is saved by bringing water to the worker with the Dixie Portable Water Carrier, instead of having him leave his job to get a drink. Lost minutes quickly multiply into lost hours where no systematic watering plan is adopted.

Workers—particularly American workers—appreciate the cleanliness of individual paper drinking cups... and the thoughtfulness of a management which provides it. ★

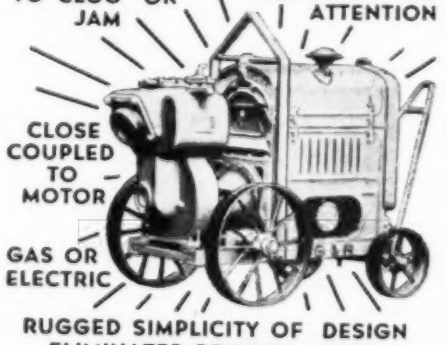
Dixie and Vortex Cups are made at Easton, Pa., Chicago, Ill., Darlington, S. C., Toronto, Canada.


● You have bought Bonds—bought generously, we know. But now the need is greater. Remember, it's your need. This time, buy
DOUBLE WHAT YOU DID BEFORE

DIXIE CUPS

DRINKING CUPS AND FOOD CONTAINERS

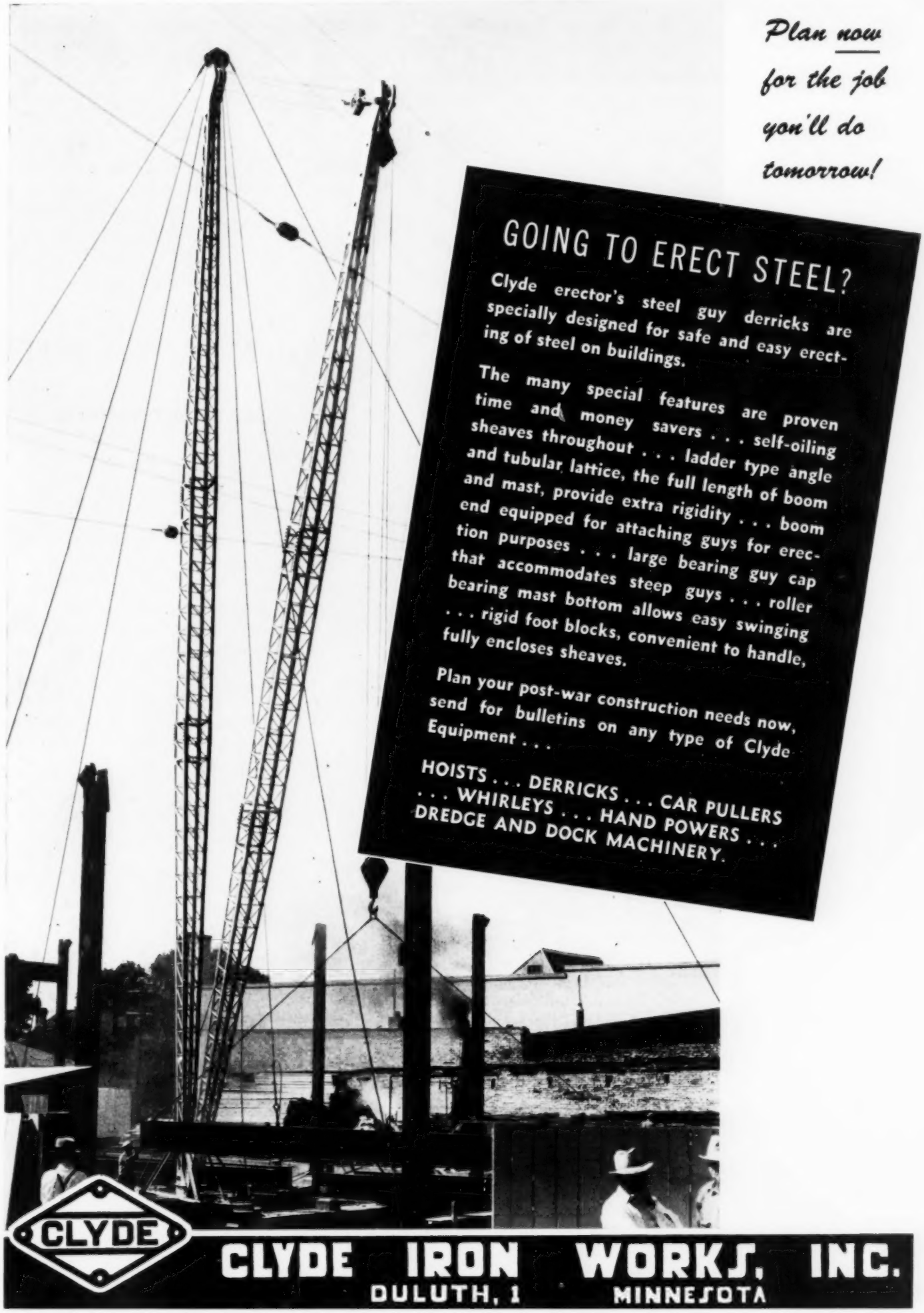
Streamlined INSIDE for Higher Efficiency and Lower Operating Costs


NO ORIFICE OR PRIMING VALVES TO CLOG OR JAM
HOLDS PRIME
REQUIRES LITTLE ATTENTION
CLOSE COUPLED TO MOTOR
GAS OR ELECTRIC

RUGGED SIMPLICITY OF DESIGN ELIMINATES RECIRCULATION—
DELIVERS GREATER VOLUME PER GAL. OF GAS
CAPACITIES UP TO 125,000 GPH

The GORMAN-RUPP CO. Mansfield, Ohio

GORMAN-RUPP
Self-Priming Centrifugal Pumps



Plan now for the job you'll do tomorrow!

GOING TO ERECT STEEL?

Clyde erector's steel guy derricks are specially designed for safe and easy erecting of steel on buildings.

The many special features are proven time and money savers . . . self-oiling sheaves throughout . . . ladder type angle and tubular lattice, the full length of boom and mast, provide extra rigidity . . . boom end equipped for attaching guys for erection purposes . . . large bearing guy cap that accommodates steep guys . . . roller bearing mast bottom allows easy swinging . . . rigid foot blocks, convenient to handle, fully encloses sheaves.

Plan your post-war construction needs now, send for bulletins on any type of Clyde Equipment . . .

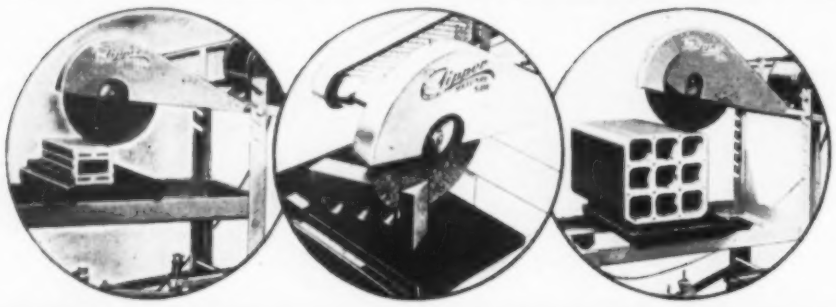
HOISTS . . . DERRICKS . . . CAR PULLERS . . . WHIRLEYS . . . HAND POWERS . . . DREDGE AND DOCK MACHINERY.

CLYDE

CLYDE IRON WORKS, INC.

DULUTH, 1 MINNESOTA

CLIPPER MASONRY SAWS
7 MODELS—A DESIGN FOR EVERY JOB!



A Special Shape or Shorter Length Need Only Be As Far Away As Your Clipper

Clipper Masonry Saws have become a familiar sight on construction work all over the country, because they really do a job

The basic feature of Clipper's is the new multiple cutting principle . . . a method developed especially for Masonry Materials. You can be sure to cut with the fastest possible cutting speed and to obtain the longest blade life.

CLIPPER MFG. COMPANY
1002 S. Van Deventer • St. Louis, Mo.

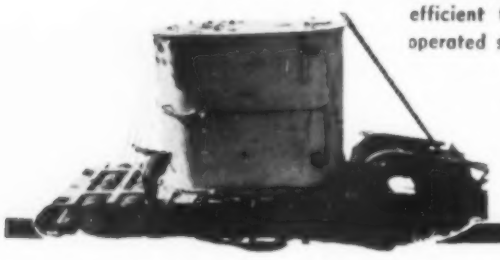
EXPERIENCE *builds 'em*
PERFORMANCE *sells 'em*

ON ROGERS TRAILERS

SAFE from Invasion is no idle boast today The enemy has been driven from the Alaskan outposts and they dare not attack us here!

ROGERS TRAILERS have played a big part in fortifying our coastlines and they are fighting with our men overseas!

The ROGERS TRAILERS which will be available to industry when present war contracts are completed, will be better-engineered and more efficient than the thousands which have been operated so successfully for many years.



ROGERS BROS. CORPORATION
Albion, Penna.

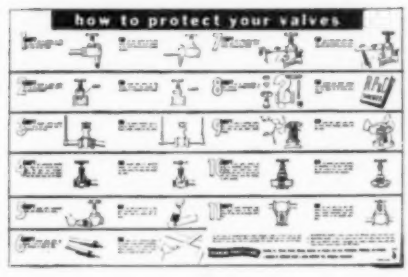
(Continued from page 134)

vice president; in immediate charge of construction were Grover Adams, general superintendent and Walter Olson, project manager. John Kearney was office manager and Richard Pitts chief engineer.

The Postal Concentration Center will be operated jointly by the Army Post Office. New York Port of Embarkation, in charge of Major General Homer Groninger and the U. S. Post Office, Albert Goldman. New York Postmaster.

★ ★ ★

Valve Do's and Dont's



ELEVEN GOOD TIPS on the handling and care of valves are illustrated in the new "Do's and Don'ts" chart just released by the Reading-Pratt & Cady Division of the American Chain & Cable Co., Inc., Bridgeport, Conn. These new 11x17-in. charts stress the protection angle by pointing out the common mishandlings that often reduce valve life. Graphic sketches portray the right and wrong way to handle each situation. Excellent for new workers, they also help refresh old hands on valve uses.

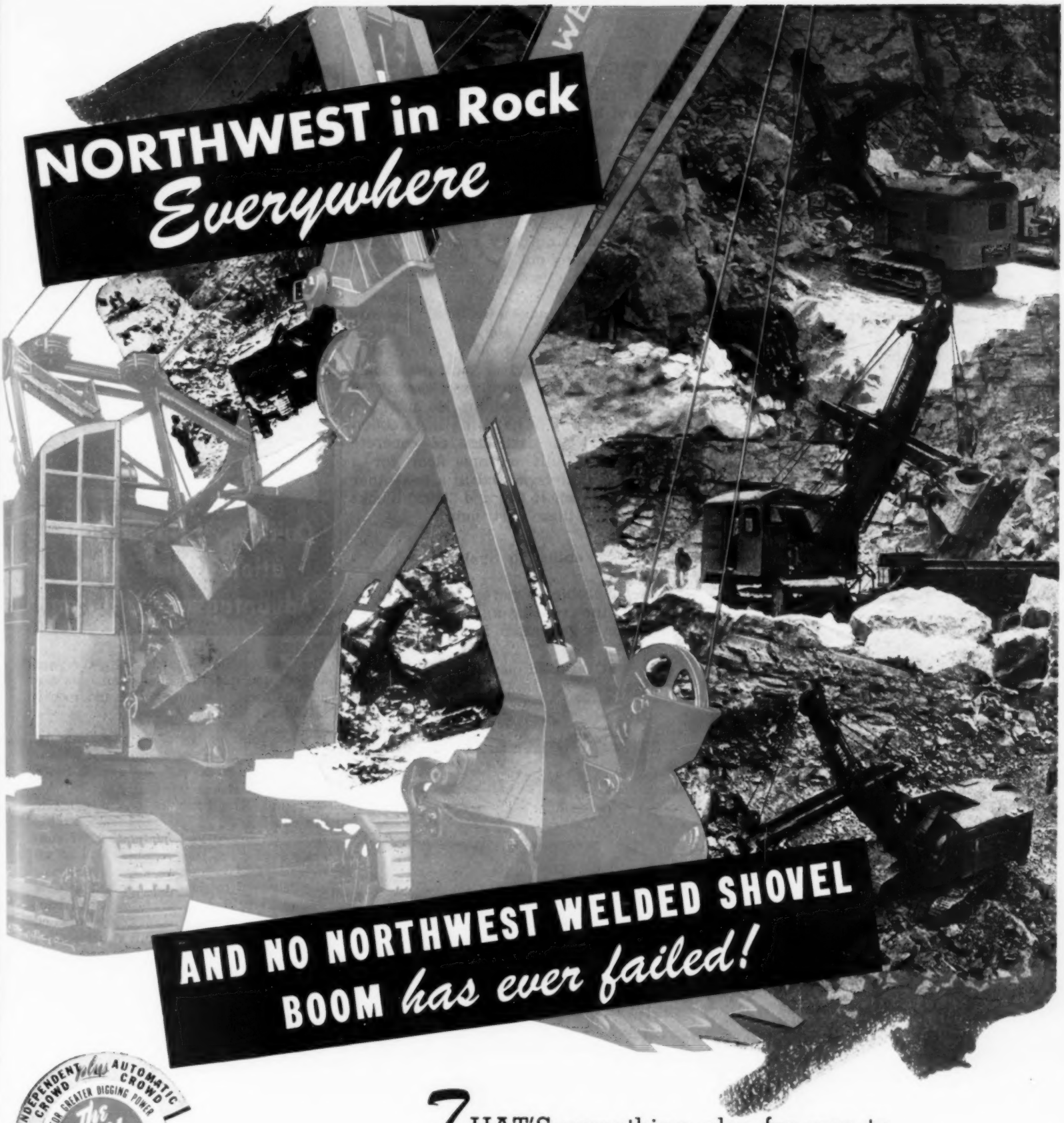
★ ★ ★

Ammunition Factory *Reconverted*

(Continued from page 68)

services was necessary in making the conversion. Time, and probably money, could have been saved by discarding the old utility lines and installing a new system, but the necessity for conserving critical materials would not permit that procedure. Practically complete general rearrangement of all utilities inside the building was required to adapt the fac-

(Continued on page 138)



INDEPENDENT CROWD plus AUTOMATIC CROWD
FOR GREATER DIGGING POWER
The DUAL CROWD

and when you have a real Rock Shovel you won't have to worry about output in dirt.

THAT'S something else for you to think about in your post war planning! Better built—cheaper to operate—a Real Rock Shovel and if you have a Real Rock Shovel you'll have high output in any kind of digging.

NORTHWEST ENGINEERING COMPANY
1728 Steger Bldg. • 28 E. Jackson Blvd., Chicago 4, Illinois

NORTHWEST

SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

LUFKIN

"ANCHOR" CHROME CLAD

STEEL TAPE

Engineers appreciate the many advantages of the Lufkin "Anchor" Chrome Clad Steel Tape for general measuring work. Jet black markings are easy to read against a satin chrome surface that won't rust, crack, chip or peel. Genuine leather hand-stitched case on a plated steel liner is exceptionally durable. Write for free catalog.

BUY THROUGH YOUR DEALER

LUFKIN

SAGINAW, MICHIGAN • New York City

TAPES • RULES • PRECISION TOOLS

(Continued from page 136)

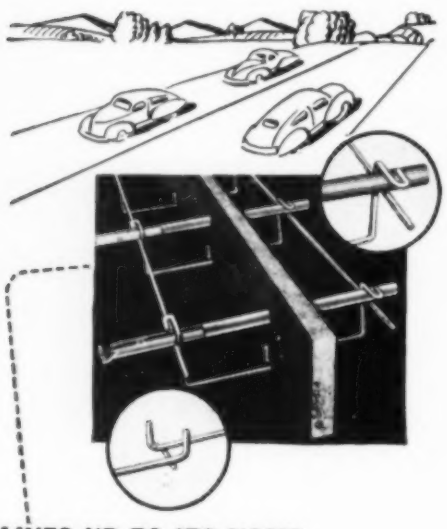
tory to straight-line production of battery cores and batteries.

Conversion crews moving onto the floors faced a wilderness of pipes, conduits and ventilating ducts extending downward from the overhead systems at the old machine locations. As a complete change had to be made in the manufacturing layout, simplicity and speed were gained by taking out the utilities back to the main connections on each floor. Only the permanent heating and plumbing lines remained in place. Workmen removed ventilating ducts, pipes, conduits, wiring, panel boards and fixtures. Machine pads were removed, and partitions, mostly of wood, were taken down for re-erection in new locations. No difficulty was encountered in handling the wooden partitions. New partitions of concrete blocks were built on one floor for a kitchen and cafeteria and in a few other places. Between 15,000 and 20,000 blocks were used in these partitions.

Ventilating System

Special problems were involved in rebuilding the ventilating system to remove fumes generated in the process of

(Continued on page 140)



LIVES UP TO ITS NAME

"QWIK-LOCK"

Expansion Joint Assemblies

EASY INSTALLATION—

FOOLPROOF FUNCTIONING

• Speed up road building—use "QWIK-LOCK". Easy to position and lock dowels—parallel to each other and to the subgrade. Result: A better job at lower cost.

Write for Catalog of Construction Accessories . . . See Our Section in SWEET'S

UNION STEEL PRODUCTS COMPANY

439 Pine Street • Albion, Michigan

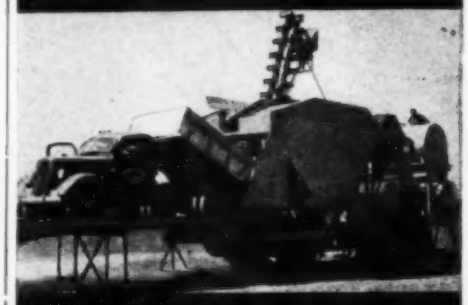
Concrete & Building Specialties, Ltd.
5354 Danforth Avenue
Toronto, Canada

Williams Wallace Company
160 Hooper Street
San Francisco
California

JOHNSON

Porto-Batcher

SAVES A LOT of TIME and MONEY



Quickly Set Up for Operation at the Most Advantageous Location

The Johnson Porto-Batcher is a complete highway portable batching plant. Its use permits these substantial time and money savings:

1. The Johnson Porto-Batcher can be towed behind a truck to the most advantageous point in the pouring area. **2.** Since the Porto-Batcher is quickly set up for operation, long hauls of mixed concrete are eliminated . . . the number of mixing units is reduced and the number of concrete yard miles lessened. Control of all operations is centralized. **3.** All materials are delivered to the batching unit in bulk material trucks . . . eliminating extra handling equipment. **4.** The Johnson patented charging skip permits full utilization of mixer capacity. By providing proper intermingling of aggregates with cement when discharged into mixer, it assures pre-mixing and pre-shrinkage . . . prevents cement from touching wet mixer opening and walls thus eliminates gumming and excessive wear. **5.** All levers are grouped in one central location to permit control of operations by one man. Write for bulletin.

Write for data on Ready Mix Plant • Bulk Cement Handling Equipment • Cement Storage Bins • Concrete Buckets • Batchers

The C. S. Johnson Company

Champaign, Illinois

SERVING THE

Petroleum Needs of the Nation

Typical Sinclair Refinery, Transportation and Distribution Units.

- SINCLAIR produces oil from more than 8000 wells located in the United States and Venezuela.
- MANUFACTURES all types of petroleum products in 10 modern refineries processing 90,000,000 barrels of crude oil annually.
- TRANSPORTS 300,000 barrels of crude oil and finished products daily through 14,000 miles of pipe lines; also employs thousands of tank cars and a large fleet of ocean tank ships.
- OPERATES a chain of waterfront terminals from the Gulf of Mexico to New England.
- DISTRIBUTES petroleum products through 2000 wholesale bulk plants which also service a network of many thousands of Sinclair Dealer stations.
- PRODUCES basic material for manufacture of synthetic rubber in one of the largest butadiene plants in the United States.

Sinclair is America's outstanding manufacturer of lubricants.

SINCLAIR LUBRICANTS-FUELS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY, 630 FIFTH AVENUE, NEW YORK 20, N. Y.

. . . Lower Your Pumping Costs

You can pump more water at less cost per gallon with a Carver Pump because it stays on the job longer at top performance. Trouble-proof design, lifetime, tungsten carbide seal, special, long-life impeller and removable liner mean less time out for repairs and maintenance. The recirculation tube is scientifically designed to provide fastest priming, peak efficiency, and correct amount of recirculation to keep priming chamber free from clogging deposits of silt, sand or dirt.

If your job entails unusual pumping conditions we will gladly submit specific performance estimates. The performance of every Carver Pump is carefully checked in our testing laboratory to make sure that it meets our high standards for performance on the job. The "Certified" tag is your assurance of peak performance for your toughest jobs. For details, see your nearby Carver distributor or write direct.

THE CARVER PUMP CO.
Muscatine, Iowa

(Continued from page 128)

battery manufacture, and for collecting dust and combustion gases. Skillful sheet-metal work was required by Reinke & Schomann, subcontractor, Milwaukee, to incorporate salvaged material with new sheet metal in ducts and hoods. Scores of hoods of varied shapes and sizes had to be fabricated and erected above all positions where solder, asphalt, waxes and resins are used in making the batteries. The hoods are joined to ducts which run horizontally under the ceilings to vertical outside stacks at the windows.

About 70 of these vertical stacks, fastened to the walls, had served to exhaust fumes and gases from the ammunition factory. These stacks were used again for the battery plant, but with two exceptions they all had to be moved to new locations. An equally large number of motor-driven fans had to be taken

SOLUTION MIXING TANKS are supported above special trough lined with tile to protect concrete floor slab against attack by acids. Rest of floor in mixing room is covered with industrial asphalt tile.

down and re-installed for the new fume, dust and combustion gas collecting systems. Installation cost of the revamped ventilating systems approached $70,000, and the cost of new sheet metal equipment, including some for manufacturing purposes, was about $120,000.

Electrical requirements for the battery plant were quite different from those of the ammunition factory. Power demands were much less than they had been previously, but the lighting requirements were greatly increased. An entirely new

(Continued on page 142)

Isaacson

KLEARING BLADES

Do it better

First developed for the U. S. Forest Service for making logged-off stump land usable, Klearing Blade has been so successful in removing trees, brush, stumps, roots and rock that it has revolutionized land clearing throughout the Pacific Northwest. Costs have been cut 50% to 75%. No doubt you too have read how it combs out roots and other material to a depth of 21" below the top of the ground, leaving the valuable top soil intact ready for plowing. Patented teeth are adjustable to three positions and especially shaped for maximum penetration and lifting power. Klearing Blade is ideal for clearing right-of way, stump land, airports, handling hard-pan or rock jobs. Piles stumps, brush, and roots dirt free, for easy burning. Now it is again available and can be obtained for your Isaacson Trac-Dozer.

KARRY-SKRAPER

KABLE POWER UNIT

SUPER-ROOTER

TRAC-DOZER

TAMPING-ROLLER

KARRY-BUGGY

2-WHEEL SKRAPER

WINCHOIST

TRAC-KRANE

KARRY-WAGON

LOGGING ARCH

DUMP-SKRAPER

Put it on in place of the ordinary blade in a few minutes.

Clear land at a surprisingly low cost and increase your tractor income.

Available for cable or hydraulic operation. See your dealer today or write for descriptive literature.

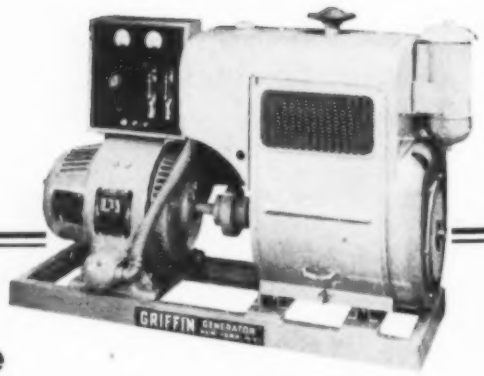
ISAACSON

Iron Works

SEATTLE

ENGINEERED TRACTOR EQUIPMENT

Engineered and built to give you the same dependable long life as all GRIFFIN PRODUCTS



Another Dependable

GRIFFIN GENERATOR

Compact, moderately priced. Sturdy construction for the construction field. Smooth operation. 120—240 volts—3 wire A.C. Light and power from the same machine.

GRIFFIN Generators are economical in operation and maintenance. Other models for lighting only. Mounted either on skids or wheels for easy portability.

Call or write any of the addresses below

FOR SALE AND FOR RENT

MID-WEST
GRIFFIN EQUIPMENT CO., INC.
548 Indiana Street · Hammond 1662
HAMMOND, INDIANA

SOUTH
GRIFFIN ENGINEERING CORP.
633 N. Myrtle Ave. · Jacksonville 5-4516
JACKSONVILLE, 4, FLA.

MAIN OFFICE: 881 EAST 141st STREET, NEW YORK 54, N. Y.
GRIFFIN EQUIPMENT CORPORATION

Rapid destruction of enemy fortifications has greatly reduced allied casualties and accounted for the quick liberation of considerable enemy territory.

In digging and material handling too, rapid discharge of the load is an essential feature. Every Owen Bucket is engineered to provide capacity grabs and rapid discharge operation—factors responsible for their outstanding performance.

THE OWEN BUCKET CO.
6020 Breakwater Ave., Cleveland, O.
Branches: NEW YORK · CHICAGO · PHILADELPHIA · BERKELEY, CAL.

OWEN BUCKETS

A MOUTHFUL AT EVERY BITE

(Continued from page 140)

lighting system had to be wired. Conduits, wiring and switches were salvaged and re-used.

Because the factory building is of reinforced-concrete flat slab construction, it was important to protect the structural slab against deterioration. In the solution mixing room, where acids might attack the concrete, the floor under the mixing tanks is covered by vitrified clay tile with asphalt joints. In the same room, the remainder of the floor is protected by industrial asphalt tile ½ in. thick. Other floors likely to be subjected to minor acid exposure are given a coating of resin varnish to seal the concrete.

Working Tools

Portable power tools and hand tools were used for nearly all the work performed by the Klug & Smith Co. and by the subcontractors. Units of new manufacturing equipment supplied by the Signal Battery Co. and the Defense Plant Corp. and installed by the contractor were not excessively large or heavy. The heaviest units handled were the 5,000-lb. drums of ball mills. For these drums and other heavy pieces the contractor used a mobile I-beam trolley supported by A-frames on casters and equipped with a 3-ton chain block. Most of the manufacturing equipment could be handled easily on three-wheel dollies or by lift trucks which are part of the permanent plant facilities. Rolling scaffolds were used for overhead work.

Machine Anchors

Great saving was made in setting and anchoring machines by using Rawlplugs instead of cinch anchors. After a machine had been accurately spotted on the concrete floor, holes were drilled into the concrete slab with a tungsten carbide drill through the bolt holes of the machine base, and Rawlplugs then were driven with hand hammers into the holes without any further moving of the machines. This method eliminated the necessity of removing the machines, installing the cinch anchors, placing the anchor bolts and setting the machine on the bolts.

About 140 men ordinarily were employed by the Klug & Smith Company and subcontractors, working a single shift six days a week. The maximum number of employees was about 200.

Lump Sum Contracts

To expedite completion, work was started under letter orders to the two principal contractors dated February 1, 1944, only a general description of the work required being available at that

(Continued on page 144)

"What can Macwhyte PREformed Wire Rope do for Me?"

Here are specific ways you benefit from the use of Macwhyte PREformed wire rope.

First, you get longer wire rope service for 3 reasons:

1. PREformed has less internal fatigue.
2. PREformed has less internal friction.
3. PREformed has better balance.

Each wire and each strand are PREformed before being laid into the finished rope. The detrimental effects of internal friction and in-

ternal fatigue, two of wire rope's greatest destroyers, are reduced to a minimum in Macwhyte PREformed. There is perfect balance. Each strand and wire carries its share of the load.

Second, you get lower cost per load carried.

In Macwhyte PREformed, every strand in the wire rope is under uniform tension. There is no "early wearing out" of some strands while the others "loaf." This perfect balance makes possible lower cost per load carried on the job.

Third, you get fewer shut-downs, less trouble.

Fewer shut-downs are the rule, because PREformed lasts longer. In these times, lost man hours due to repairs or replacements can be disastrous. PREformed helps prevent this.

Less trouble is encountered be-

cause PREformed is flexible, easy to handle. The perfect balance of strands means that PREformed is kink-resistant, very easy to take off the reel and put on your equipment.

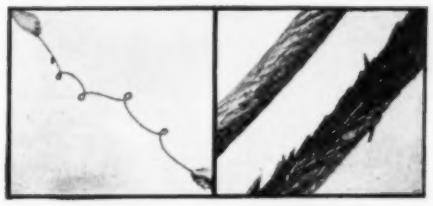


Figure A *Figure B*

Fourth, you have less chance of rope loss or workman injuries.

Macwhyte PREformed is not likely to curl up *(Figure A)* during unreeling and installing. Therefore, the risk of kinking and permanently damaging the rope is greatly diminished.

Nor does PREformed wire rope wicker and become dangerous to handle *(Figure B)*. A wire broken from wear in a PREformed rope lies in place, does not wicker out to injure workmen's hands.

In addition to these 4 specific benefits, add this 5th: Macwhyte Internal Lubrication that goes around every wire in every strand of Macwhyte PREformed wire rope.

Inside bearing surfaces of wires are thus protected against friction and corrosion. All spaces between

wires are filled with lubricant to keep out moisture and resist ordinary acids. This tenacious, heavy lubricant Macwhyte uses, clings to wires unaffected by the hottest, coldest, driest, or most humid temperatures.

Macwhyte engineering experience may help you. Tell us your problem. We'll assist you in getting the *correct* rope for your equipment.

MACWHYTE PREformed WIRE ROPE

Plus Internal Lubrication Selected Steels Tested-Proved

The correct rope for your equipment

NO. 754

MACWHYTE COMPANY

Wire Rope Manufacturers

ARMY E NAVY

2941 FOURTEENTH AVENUE KENOSHA, WISCONSIN

Mill Depots: New York · Pittsburgh · Chicago · Fort Worth · Portland · Seattle · San Francisco. Distributors throughout the U.S.A.

MACWHYTE PREformed and Internally Lubricated Wire Rope · MONARCH WHYTE STRAND Wire Rope · MACWHYTE Special Traction Elevator Rope · MACWHYTE Braided Wire Rope Slings · MACWHYTE Aircraft Cables and Tie-Rods · MACWHYTE Stainless Steel Wire Rope · MACWHYTE Monel Metal Wire Rope

The performance records made by over 2,000,000 BRIGGS & STRATTON Engines testify to their perfection of design, their fine engineering, and to precision production.

Air-Cooled Power

4 CYCLE
BRIGGS & STRATTON
GASOLINE ENGINES

Manufacturers of all types of appliances, tools and equipment requiring dependable, compact power units are invited to investigate the performance record of Briggs & Stratton engines. The latest models are backed by the experience gained in twenty-five years of *continuous* production of AIR-COOLED Gasoline Engines. BRIGGS & STRATTON CORPORATION, Milwaukee 1, Wisconsin, U. S. A.

(Continued from page 142)

time. Complete plans and layout were developed as quickly as possible by the Signal Battery Co. working under a lump sum architect-engineer contract. As soon as plans and specifications were available, fixed price contracts for removal of the ordnance machinery and for conversion of the plant were negotiated with the contractors.

Direction

Conversion of the building to a battery factory is being carried out for the Signal Corps by the Corps of Engineers, U. S. Army, under the direction of the Milwaukee District Engineer Office, of which Colonel McD. D. Weinert, C.E., is district engineer. Lt. Col. A. R. Striegl, C.E., operations officer, is in general charge for the district, while Maj. George S. Denithorne, C.E., resident engineer at the Milwaukee Ordnance Plant, is directly responsible for the execution of the work. C. E. Lindman is contruction engineer on Major Denithorne's staff.

For the Klug & Smith Co., Milwaukee, W. H. Emory, Jr., vice president, is in charge of the reconversion job, assisted by Carl R. Holdampf, assistant chief engineer. Removal of ammunition manufacturing machinery was directed for Hans Lochen & Son, Inc., Milwaukee, by Russell Lochen. The sheet metal subcontract for Klug & Smith Co. was executed by Reinke & Schomann, Milwaukee, under the direction of Robert Schomann, in charge on the job. Other subcontractors included Wenzel & Henoch, contractors for all piping work, and Uihlein Electric Co., electrical contractor, both of Milwaukee.

★ ★ ★

Peru Hydro Plant

(Continued from page 65)

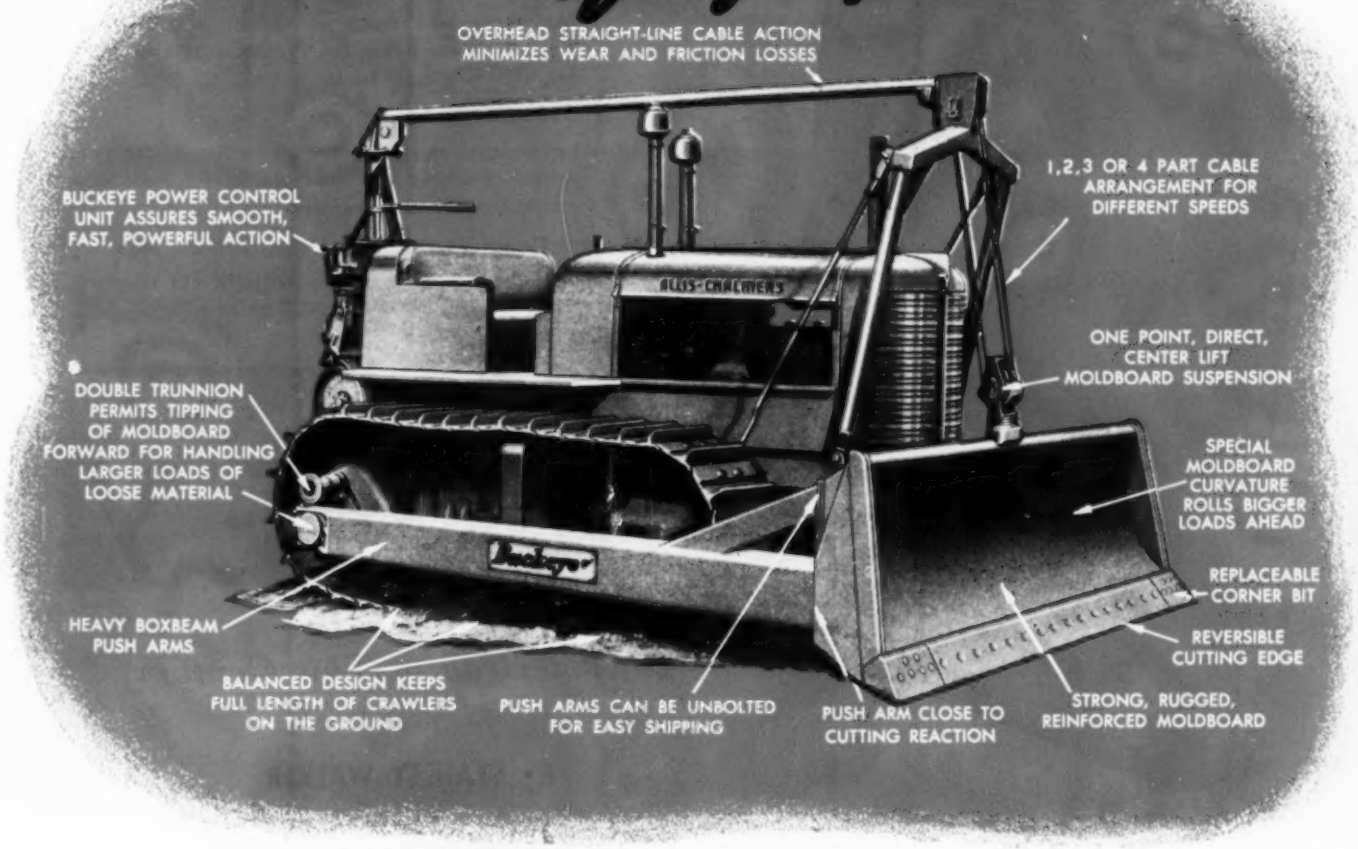
at the upper end of this canyon and carried through a continuous tunnel in solid granite for 5.7 mi. to vertical penstocks leading to a powerhouse.

In the face of the almost vertical walls of the canyon absence of sites safe against the hazards of falling rock dictated underground locations for the powerhouse and the penstocks. A chamber is being excavated 1,375 ft. back from the face of the canyon in solid rock to house the water wheels and the generators. The

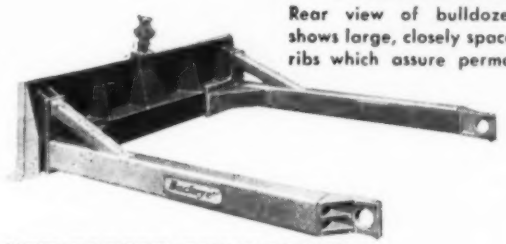
(Continued on page 150)

here's why the NEW Buckeye Dozer...

sets new high standards of dozing performance


OVERHEAD STRAIGHT-LINE CABLE ACTION MINIMIZES WEAR AND FRICTION LOSSES
BUCKEYE POWER CONTROL UNIT ASSURES SMOOTH, FAST, POWERFUL ACTION
1,2,3 OR 4 PART CABLE ARRANGEMENT FOR DIFFERENT SPEEDS
ONE POINT, DIRECT, CENTER LIFT MOLDBOARD SUSPENSION
DOUBLE TRUNNION PERMITS TIPPING OF MOLDBOARD FORWARD FOR HANDLING LARGER LOADS OF LOOSE MATERIAL
SPECIAL MOLDBOARD CURVATURE ROLLS BIGGER LOADS AHEAD
REPLACEABLE CORNER BIT
HEAVY BOXBEAM PUSH ARMS
REVERSIBLE CUTTING EDGE
BALANCED DESIGN KEEPS FULL LENGTH OF CRAWLERS ON THE GROUND
PUSH ARMS CAN BE UNBOLTED FOR EASY SHIPPING
PUSH ARM CLOSE TO CUTTING REACTION
STRONG, RUGGED, REINFORCED MOLDBOARD
ALLIS-CHALMERS
Buckeye

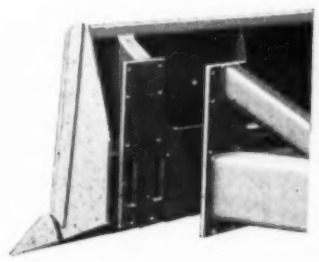
RIGID MOLDBOARD



Rear view of bulldozer moldboard shows large, closely spaced, moldboard ribs which assure permanent rigidity.

REINFORCED PUSH PLATE

Worm's eye view reveals large number of heavy, supporting ribs reinforcing push plate for toughest dozing jobs.



DEMOUNTABLE PUSH ARMS

Push arms can be easily unbolted to save shipping space and facilitate handling. Note large bolting areas which provide the rigidity of one-piece unit.

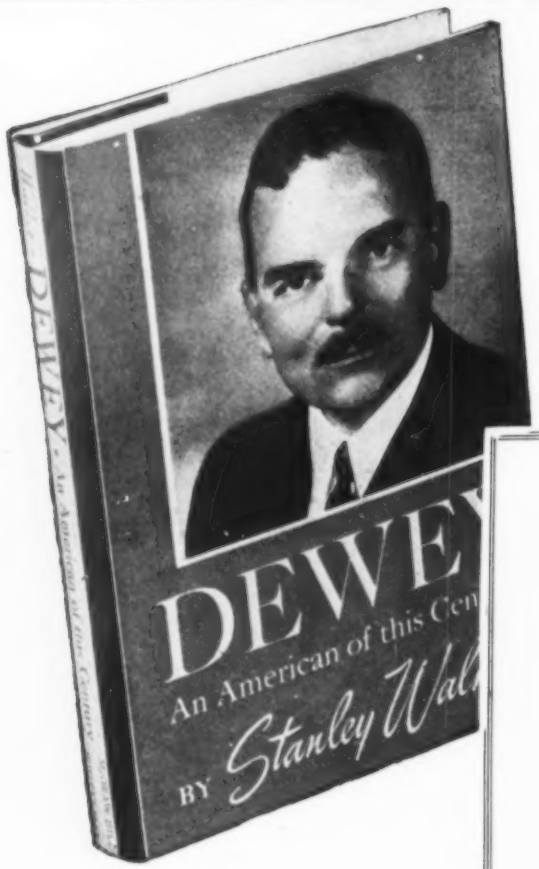
ALL these features are the result of thoroughly engineered design combined with high quality of material and exceptionally rugged construction which enable the new Buckeye cable-controlled dozer to outperform all others. It is strong and rigid enough to take the full power of the tractor on one corner of the moldboard without permanent deflection. Rolling bigger loads, uprooting trees and stumps, digging out boulders, levelling, back-filling, grading in all kinds of ground conditions are everyday jobs for the new Buckeye dozer. There's never more than the minimum of lost time for repairs and maintenance. Here's your postwar bulldozer ready now!

Write for specifications.

THE BUCKEYE TRACTION DITCHER CO.

Findlay, Ohio

JUST PUBLISHED BY McGRAW-HILL



WALTER TROHAN, in the *Chicago Tribune*, says:

"for those who desire to become acquainted with the Republican candidate for President and what he stands for, this is a must book."

N. Y. Journal-American:

"a straightforward picture of the Republican Presidential nominee without the usual worshipful embellishments to which most biographers are prone."

MARQUIS CHILDS, in the *N. Y. Herald-Tribune*, says:

"the Dewey story is here skilfully put together, and to many readers parts of it will be new."

DEWEY

An American of This Century

By STANLEY WALKER

A full-length, authoritative, highly readable study of the Republican candidate, written by a veteran newspaperman. Here is the amazing record of the G. O. P.'s fighting standard-bearer . . . here are his principles and beliefs . . . here we see him at work and at play, in struggle and triumph. Supplemented by 45,000 words of excerpts from Dewey's major speeches and statements.

Other
McGRAW-HILL *Books*
of Current Interest

1. Raymond Clapper: WATCHING THE WORLD

Edited and with a biographical sketch by Mrs. Raymond Clapper. Introduction by Ernie Pyle. $3.00

2. ASIA'S LANDS AND PEOPLES

By George B. Cressey, Syracuse University. A geography of one-third the earth and two-thirds its people, with considerable attention to postwar aspects of geostrategy. $5.50

3. BRAZIL ON THE MARCH

By Morris L. Cooke, American Technical Mission to Brazil. Absorbing study of the Brazilian economy in terms of national background, peoples, resources, and mounting industrialization. $3.00

4. BULLDOZERS COME FIRST

By Waldo G. Bowman, Nathan A. Bowers, Harold W. Richardson, Edward J. Cleary and Archie N. Carter. Eyewitness story of U. S. war construction operations in foreign lands. $2.75

Order by number—Use coupon.

Really *know* this candidate

•

SEND THIS McGRAW-HILL EXAMINATION COUPON

McGRAW-HILL BOOK CO., 330 W. 42nd St., New York 18

Send me the books checked and encircled below, for 10 days' examination on approval. In 10 days I will pay for books, plus few cents postage, or return them postpaid. (Postage paid on cash orders.)

☐ Walker's Dewey, An American of This Century, $2.50

1 2 3 4

Name .....

Address .....

City and State .....

Position .....

Company .....CMA 10-44

(Books sent on approval in United States only.)

ALWAYS READY...

An unprepared, unprotected transport in submarine-infested waters would be in for trouble. When roads get icy, highway service crews are in for trouble, too, if untreated stockpiles are frozen — hard to load — hard to spread — slow to act on ice.

Every year more officials stock up early on ice control abrasives, treat them with calcium chloride and cover or store them in sheltered bins. Thus they are "Always Ready" when ice forms, to get quick coverage of fast acting, easy to load, easy to spread abrasives.

Abrasives treated with calcium chloride quickly dig into ice, hold fast and give traction. Such real service to traffic may be supplied with substantial savings in materials, labor and time if you'll use calcium chloride in your ice control grits.

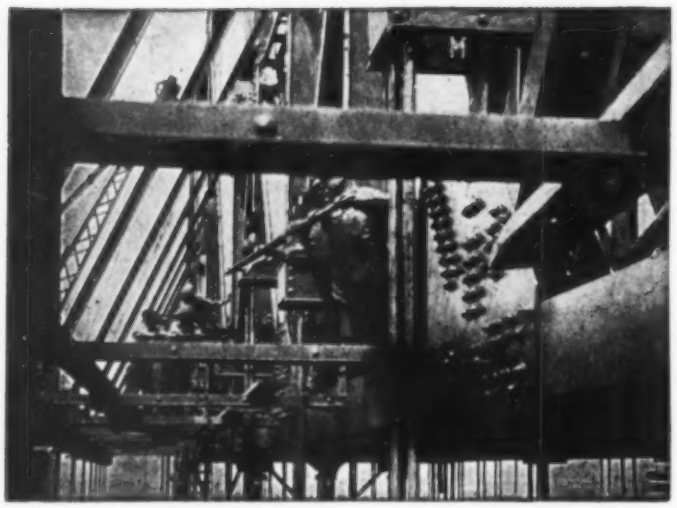
Write for our Bulletin No. 27, "Skidproofing Icy Roads and Streets." It will be sent on request.

CALCIUM CHLORIDE ASSOCIATION
4145 Penobscot Building • Detroit 26, Michigan

ICE CONTROL WITH
CALCIUM CHLORIDE
FAST · POSITIVE · ECONOMICAL

Gears Icy Roads to Tires

HIGH UP



AND

LOW DOWN

1869 1944

LOWELL WRENCHES

GIVE SERVICE THAT SATISFIES

You can take it for granted that new and veteran Lowells are busy on War construction. The thing to remember for now—and for after the War—is the fact that a *Lowell lasts for years.* Every Lowell is a husky, simple tool that speeds work, saves effort, gets the job done *right.*

LOWELL REVERSIBLE RATCHET WRENCHES

are made in a wide variety of types and sizes both hex and square, suited to many kinds of heavy construction erecting and maintenance work.

Straight Line LEVERAGE!

See how each pawl, when engaged, transmits leverage from the solid stock of the handle, direct to the gear in a *straight line* and with a square contact. The pawl is in compression only — no shear, no tension, no torsion. The shipper carries none of the load. This strong construction insures steady service.

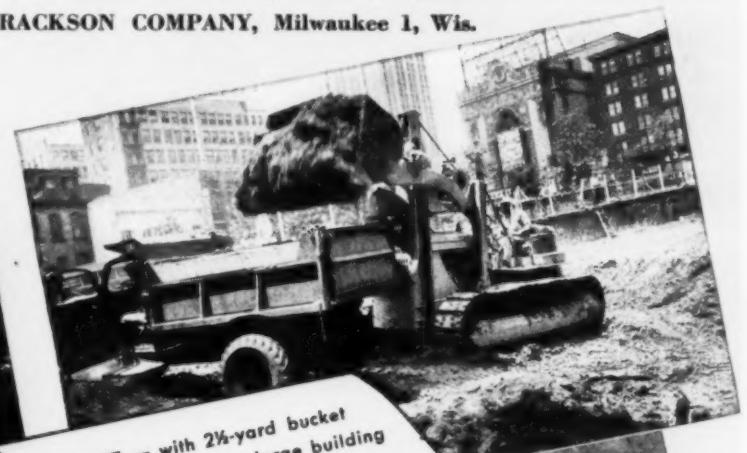
LOWELL WRENCH CO.
WORCESTER 8, MASS.

TRAXCAVATE!

It's the modern earth-moving and material handling method. TRAXCAVATORS, the dependable tractor excavators, combine in one machine, the usefulness of a shovel, loader, scraper, bulldozer, anglegrader, etc. There's a size for every job and purpose.

See your Trackson-"Caterpillar" dealer or write **TRACKSON COMPANY, Milwaukee 1, Wis.**

LONG ISLAND STUMPS—TRAXCAVATORS take them right along in their stride. The most useful machine on any job.



BIG T7 — with 2½-yard bucket excavates for a large building in downtown St. Louis, Mo.

MUCK and MIRE—No obstacle for TRAXCAVATORS as shown on this tough digging job at Gardner, Kansas.

GRAVEL—Loading pit run gravel at Everett, Washington. TRAXCAVATORS are fast, economical ...can spot loads where needed.

DAM ROCK—Model T4 placing rock for huge California dam. ...Best dam machine built!

SUBWAY—Excavating for a Chicago subway station. TRAXCAVATORS get high production even in awkward, close quarters.

Write for informative literature to TRACKSON CO., Milwaukee 1, Wis.

TRAXCAVATOR

The Original Tractor Excavator

(Continued from page 144)

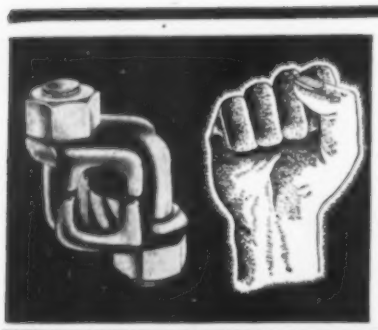
penstocks will be a row of vertical shafts, each 6 ft. in diameter and 1,435 ft. deep, one for each of the five 25,000-kw. generator-water-wheel units.

The shafts will be sunk through the solid granite by specially designed Calyx drills. These drills will start from a bench on the side of the mountain, and descend down the hole as the drilling progresses. While the drill is in operation it is held in place by clamps bearing on the face of the hole. Use of this type of drill for the depths involved is made possible by the massive, homogeneous character of the granite formation at the site.

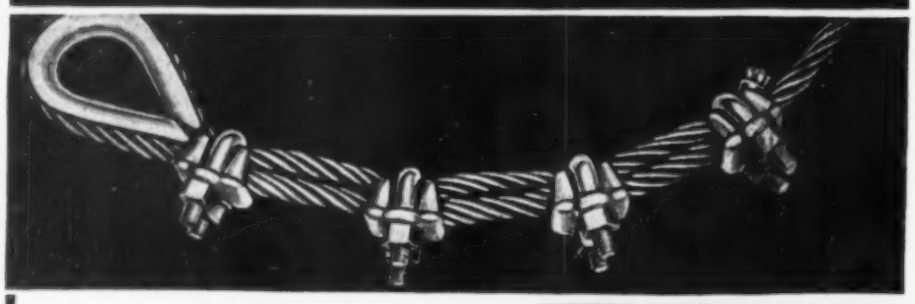
Many years ago the 36-in. gage railroad was built from Chimbote to a point about a mile below the powerhouse site. Grading for the extension of this railroad up the canyon also was completed, including some sixty-odd tunnels, but the rails were never laid through the canyon. During the last 15 years the railroad grade through the canyon has served as a link in the 316-mi. highway from Lima to Chimbote. This highway furnishes access to the project, but is across the canyon from the tunnel and the powerhouse.

General construction plans for the proj-

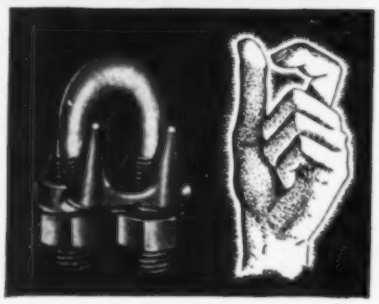
(Continued on page 152)



HAVE YOUR ROPE CLIPS A
"FIST-GRIP"?
LAUGHLIN "FIST-GRIP" CLIPS
SAVE ROPE — SAVE CLIPS
SAVE TIME



OR A
"FINGER-PINCH"?
ORDINARY U-BOLTS
WASTE ROPE — WASTE CLIPS
WASTE TIME



Help Yourself and the War Effort by Using Laughlin "FIST-GRIP" Clips

Congratulations to the wire rope companies in Victory Rope-Saving Drive! Keep it up.

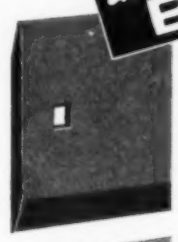
Wire rope users—if you haven't used Laughlin "Fist-Grip" Safety Clips to help you in this program . . . try them now. See how they save rope . . and clips, time, and tools as well.

Laughlin's complete line of wire rope and chain fittings is distributed through Mill, Mine and Oil Field Supply Houses.

FORGING A SHARE IN VICTORY

THE THOMAS
LAUGHLIN Company
PORTLAND 6, MAINE

Shunk Snow Plow and Ice Removal BLADES



Proved record of superior performance. Made of specially developed steel to withstand severe service conditions.

FOR ALL TYPES AND MODELS OF SNOW PLOWS
Various widths, lengths, thicknesses--flat or curved--standard or special--punched ready to fit your machine.

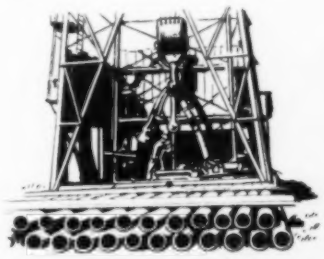
SHUNK SAW-TOOTH ICE BLADE
Amazingly effective. Thoroughly breaks up and removes heavy, slippery ice and snow formations. Replaces all types of snow plow blades or maintenance units. Write for Bulletin and name of nearest Distributor.

Shunk
MANUFACTURING COMPANY
ESTABLISHED 1854
BUCYRUS, OHIO.

For the new dump trucks, shovels, compressors, locomotives, or the various other heavy-duty construction and material handling equipment you are planning to buy, specify Cummins Diesel power. Practically all of the leading manufacturers offer this diesel as optional equipment.

In the Northwest Woods, Cummins Diesels do the complete job —from show to siding. They power yarders, loaders and tugs . . . trucks that handle up to 240,000 pounds (three carloads). In this service, Cummins Diesels are the symbol for "cheap logs."

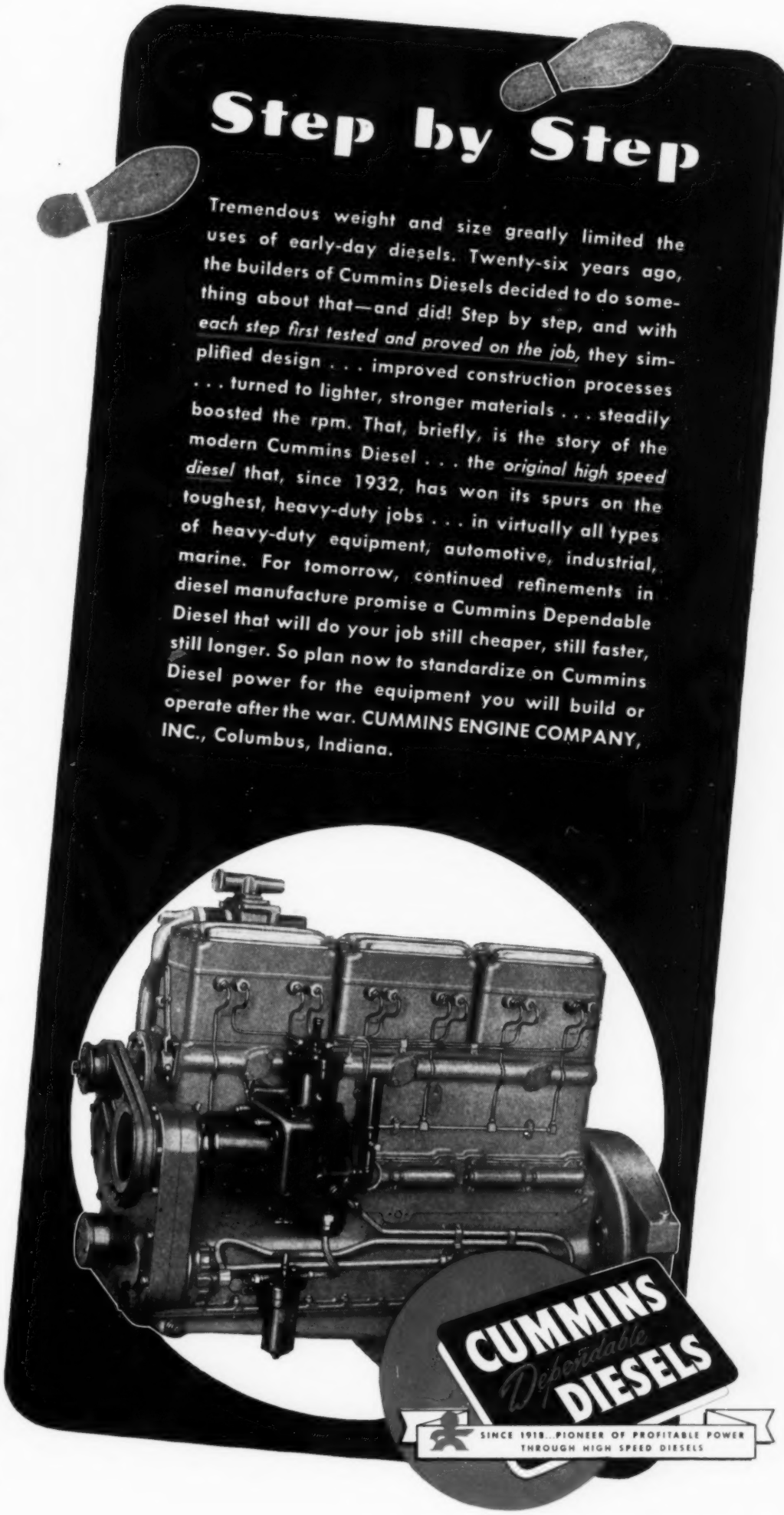
In the commercial fishing fleets of the Pacific, Atlantic and Gulf coasts, and in all types of work boats and pleasure craft, Cummins Marine Diesels—propulsion engines and generating sets alike—have become a byword for dependable, low-cost performance.



In the vast Mid-Continent area, the world's greatest oil producing territory, Cummins Dependable Diesels power more rotary and cable tool drilling rigs and oil well service units than any other make of diesel engine.

Step by Step

Tremendous weight and size greatly limited the uses of early-day diesels. Twenty-six years ago, the builders of Cummins Diesels decided to do something about that—and did! Step by step, and with *each step first tested and proved on the job*, they simplified design . . . improved construction processes . . . turned to lighter, stronger materials . . . steadily boosted the rpm. That, briefly, is the story of the modern Cummins Diesel . . . the *original high speed diesel* that, since 1932, has won its spurs on the toughest, heavy-duty jobs . . . in virtually all types of heavy-duty equipment, automotive, industrial, marine. For tomorrow, continued refinements in diesel manufacture promise a Cummins Dependable Diesel that will do your job still cheaper, still faster, still longer. So plan now to standardize on Cummins Diesel power for the equipment you will build or operate after the war. CUMMINS ENGINE COMPANY, INC., Columbus, Indiana.



40 years ago, **Sterling began to build BETTER wheelbarrows, engineered to haul maximum loads over a long period of time, at minimum cost . . .** *Today,* **all over the country, Sterlings are proving indispensable in the nation's efforts to speed production, conserve materials and win the war . . .** *Tomorrow,* **after peace has been restored, Sterlings will again be available, in all styles and capacities, to help in the period of reconstruction.**

STERLING WHEELBARROW CO., MILWAUKEE, WIS.

Look for this Mark of STERLING Quality

Sterling WHEELBARROWS

BROWNHOIST BUCKETS

Above you see a typical Brownhoist Bucket doing its share of speeding America's Industrial Production. Brownhoist buckets take deep, clean, bites. Extra large sheaves reduce rope wear and maintenance. Sturdy construction insures long life. For facts and prices about Brownhoist Rope-Reeve, Power-Wheel and Link-Type buckets write to Industrial Brownhoist Corporation, Bay City, Michigan. Offices in New York City, Philadelphia, Pittsburgh, Cleveland and Chicago.

(Continued from page 150)

ect embrace the diversion of the stream through a tunnel driven solely for that purpose from just above the site of the permanent dam that will turn the water through the main tunnel leading to the powerhouse. This temporary tunnel is being driven upstream from a portal 260 ft. below the site of the permanent dam. It will be sealed with a specially designed concrete drop gate after the main tunnel and the powerhouse are ready to operate.

Meantime, the main tunnel is being driven simultaneously in both directions from six adits spaced approximately equal distances apart along the 5.7 mi. location. These adits had to be located

TYPICAL HEADING penetrates solid granite formation. Tunnel will operate under pressure without concrete lining.

high on the very steep solid granite walls of the canyon. Opening of access trails to them could be accomplished effectively only by the hardiest type of workmen accustomed to local mining and other heavy rockwork conditions. Such men were available from the valley above the canyon and from mining operations in Peru.

All six adits have been opened for some time. Pending the delivery of pneumatic drills and electrically driven compressors from the United States, drilling has been done by hand and the muck pushed out manually in mine cars. Such methods have been tenable only because of quite efficient labor at very low wages, compared with American standards.

To obtain gravity drainage and gravity movement of the muck from the headings, the profile of the tunnel, which is about 18.5 ft. in diameter, was given a slight rise in both directions from each adit. To accomplish this the tunnel grade

(Continued on page 154)

SOMEWHERE WEST OF CODY

A silver arrow . . . streaking across the prairies . . . up the mountains . . .
down to the coast. It's a streamlined train, *Diesel-powered.*
Today, it carries essential wartime travelers . . . and points unerringly to low-cost, luxury
transportation for all . . . after Victory. Lighter weight and greater power
have increased payload, cut costs per passenger mile.
Another good example of the rich benefits Diesel power brings.
Today, Diesel, as prime and auxiliary power for ships, carries men and material
into the fight. It produces electric power where needed . . . drives tractors
that build air bases, roads, cantonments. It's a weapon, today.
Tomorrow it will again serve man. Increased use of Diesel power will bring better living
for all. And American Bosch, as supplier of precision-built fuel injection
equipment to American engine builders, will continue to serve . . . with competent
world-wide maintenance facilities, equipment to meet every need,
and the experienced engineering counsel to apply it to the specific job.
AMERICAN BOSCH CORPORATION • SPRINGFIELD, MASSACHUSETTS

AMERICAN BOSCH

AVIATION AND AUTOMOTIVE ELECTRICAL PRODUCTS • FUEL INJECTION EQUIPMENT

(Continued from page 152)

at all adits was established at the elevation of the downstream adit. These grade points at the adits are far below the hydraulic gradient of the tunnel, which will operate under pressure for its entire length.

★ ★ ★

Large-Diameter Test Cells

(Continued from page 79)

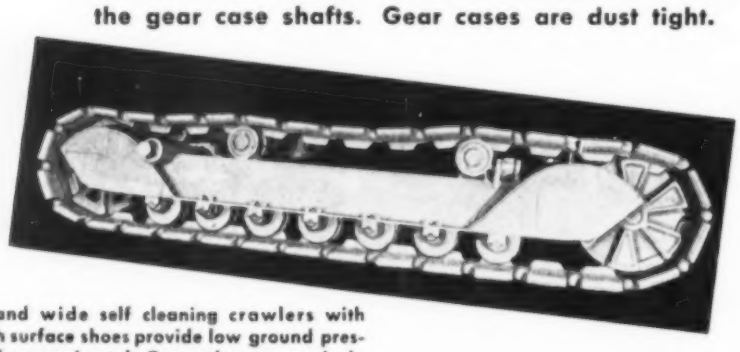
third to provide forms for supporting concrete.

Side-wall sections of the test cell next were constructed by shooting pneumatically applied Gunite against the previously completed vertical walls in the area between the invert and the top form. Operators standing inside the cell applied this concrete from nozzles and shaped it

(Continued on page 156)

PARSONS TRENCHLINER

The Parsons Model 250 Trenchliner design has been guided by years of ditching experience. The many exclusive engineering and construction features provide maximum efficiency in any material short of solid rock. Low maintenance and operating costs mean more ditch per dollar. Two sets of speeds . . . five in each transmission . . . permit maximum operating speeds to suit the greatly varying digging conditions of trenching operation. Gears are enclosed, running in oil . . . cut from solid steel blanks, fitted on precision ground alloy steel shafts. Anti-friction bearings are used for mounting all the gear case shafts. Gear cases are dust tight.



Long and wide self cleaning crawlers with smooth surface shoes provide low ground pressure of approximately 7 pounds per squre inch.

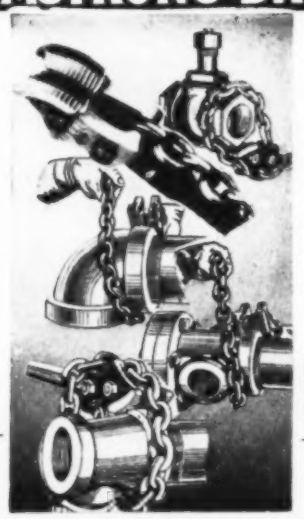
THE PARSONS COMPANY

• • • • NEWTON, IOWA • • • •

TRENCHING EQUIPMENT PARSONS

Look for the Arm-and-Hammer

ARMSTRONG BROS.



IDEAL CHAIN TONGS

For Pipe, Fittings and Flanges

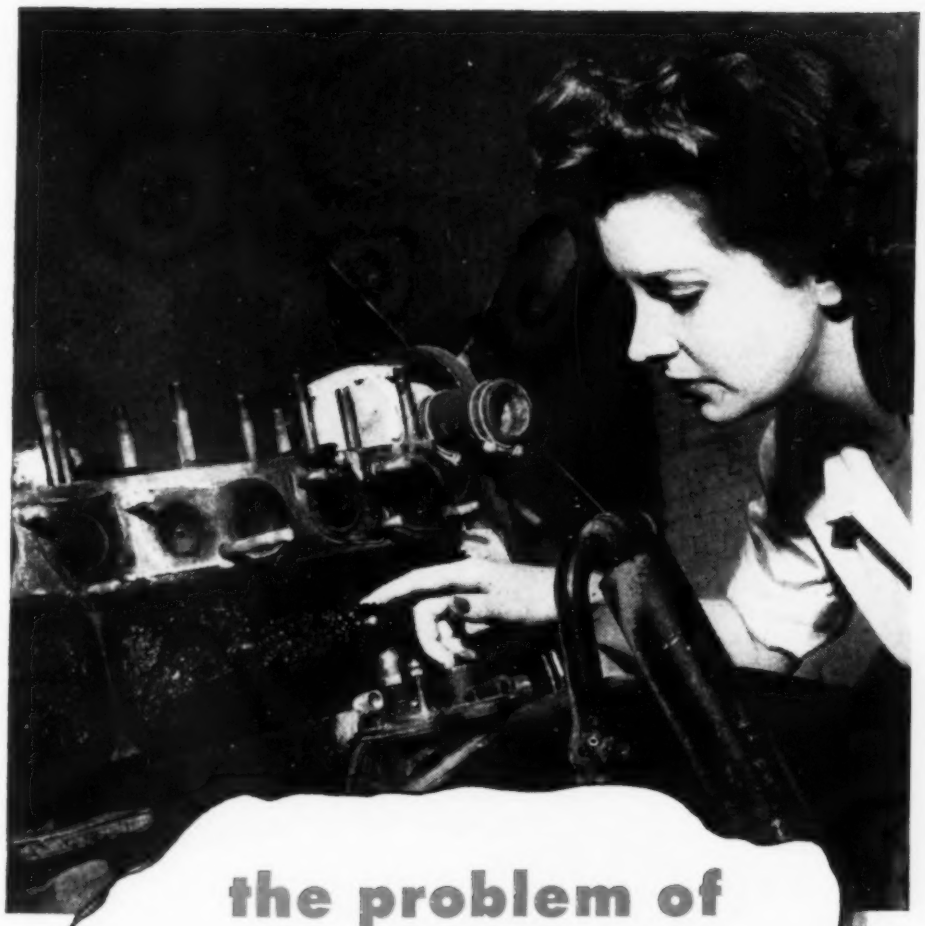
The JAWS have straight teeth for pipe, and V shaped teeth for fittings. Drop-forged from special high carbon steel carefully milled, heat-treated and hardened for toughness and lasting qualities.

The HANDLES are forged from spring steel heat-treated to give the required stiffness.

The CHAINS are proof-tested.

Write for catalog C-39a for complete showing and description of Armstrong Bros. Pipe Tools.

ARMSTRONG BROS. TOOL CO.
"The Tool Holder People"
334 N. FRANCISCO AVE. CHICAGO, U.S.A.
Eastern Warehouse & Sales: 199 Lafayette St., New York



the problem of SLUDGE

IT IS well known among automotive engineers that engine deposits (sludge) cause stoppage of oil circulation, sticky rings, oil pump trouble and other serious damage resulting in overhaul time and expense.

Sludge either stays in suspension in the oil and causes the lubricant to become black, or it sticks to the motor parts and does its dirty work of destruction.

LOW AND HIGH TEMPERATURE SLUDGE

There are two general types of sludge – that caused by low temperature operations and that by high.

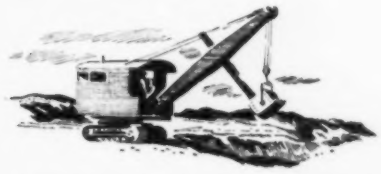
Low temperature sludge is usually a semi-solid material with the consistency of soft mud. It is composed of oil mixed with water and fine particles of carbon, metal, dirt, dust or fuel gums.

"Stop and Go" operation with prolonged idling of the motor is a common cause of low temperature sludge. A leak in the water system surrounding the cylinders may also be responsible. Low temperature sludge clogs the oil lines and screens, resulting in burned out bearings and scuffed cylinder walls.

The principal difference between high temperature sludge and low is that the former contains large amounts of resins resulting from the oxidation of the oil in the crankcase. This type of sludge is comparatively free from water and soot.

High temperature sludge produces two different kinds of deposits in the engine. The granular or "coffee ground" sludge in the crankcase or oil pan and on the surface of the pump screen is well-known to mechanics. Varnish, gummy or lacquer-like deposits that form on piston and ring faces and cylinder walls, because of high temperature oxidation of thin oil films, is another kind.

High temperature sludge is caused from prolonged high speed and engine operation, overloading the engine, clogged radiator or cooling system.



HOW TO REMEDY SLUDGE SITUATION

Low temperature sludge can be easily recognized by simply heating some of the deposit on a piece of metal over a flame. If the material foams or sputters and crackles, then water is present. To remedy this, check for internal water leaks and raise the temperature of the cooling water to 160° to 180° and keep it there by means of radiator shutters or thermostats.

To remedy high temperature sludge, inspect radiators and water jackets and see that they are clean and free of mud and scale. Drain and flush crankcase frequently, especially in heavy duty service. Oxidation of the crankcase oil can be minimized by the use of oil coolers in heavy duty truck service. Keep the crankcase oil temperature below 200° F.

To prevent either type of sludge, keep the lubricating oil clean. Filtering is not enough. Frequent draining and flushing of the crankcase is essential. Drain oil while hot. Base drain periods on a type-of-use basis, rather than time or mileage interval. Keep both air and oil filters free from dust and other foreign matter.

MACMILLAN RING-FREE OIL HELPS REDUCE SLUDGE – *One of your most effective sludge remedies is a good lubricating oil. Macmillan Ring-Free Motor Oil (for either Diesel or gasoline fuels) is so refined that it removes the carbon and sludge from the working parts of the engine. It cleanses as it lubricates. The deposits are kept in the oil in suspension and are drained off when you change oil. That's why Ring-Free is black when it's drained.*

You'll be surer of fewer motor troubles with Ring-Free Oil.

Free Folder on Sludge – Its Causes and Cures

Write today for your copy • Address: Macmillan Petroleum Corp., 530 W. Sixth Street, Los Angeles 14, Calif.

MACMILLAN RING-FREE MOTOR OIL

MACMILLAN RING-FREE MOTOR OIL

MACMILLAN PETROLEUM CORPORATION – 50 WEST 50TH STREET, NEW YORK 20 • 624 SOUTH MICHIGAN AVENUE, CHICAGO 5 • 530 WEST SIXTH STREET, LOS ANGELES 14 • COPYRIGHT 1944, MACMILLAN PETROLEUM CORPORATION

A COMPLETELY SELF-CONTAINED

Portable

MIXING UNIT

For Handling

COLD MIX MATERIALS

BUILT IN 4 SIZES

For 600 to 2500 Lb. Batches

For handling cut back, emulsion or similar cold mix materials, this H & B Model "M" portable mixing plant requires no additional equipment except a storage tank for the bituminous materials. The plant is furnished complete with folding elevator, weighing equipment, pug mill mixer, pump and power unit. Separate batch weighing of aggregate and asphalt insures accurate and uniform mixtures. All controls conveniently located for one-man operation. Bulletin M-44 will be sent on request. Also built in semi-portable type, without wheels (Model C). Bulletin C-44.

HETHERINGTON & BERNER Inc.

735 Kentucky Avenue • Indianapolis 7, Indiana

H&B *Hetherington & Berner*

"CLEVELANDS"

Fast – Flexible – Rugged

MEET FULLY YOUR DITCHING REQUIREMENTS for - - - -

- - - Gas, Oil, Water Lines — Air Fields — Sewers — Drain Tile— Telephone and Telegraph Conduits and Building Foundations —

Finely balanced—correctly designed—powerful—rugged—fast—easily maneuverable on full crawler mounting—and strongly resistant to wear and abuse, "CLEVELANDS" represent the utmost in ditching economy and efficiency. That's why they are delivering Top Performance on many military projects and civilian jobs.

"CLEVELAND" Equipment includes: — Ditchers (Wheel and Ladder Type in several models) Side Boom Backfillers — Tampers — Pipe Cranes — etc.

THE CLEVELAND TRENCHER COMPANY

20100 ST. CLAIR AVE "Pioneer of the Small Trencher" CLEVELAND 17, OHIO

"CLEVELANDS" Save More . . . Because they Do More

(Continued from page 154)

in conformity with the wooden form rings which served as templates. A slot, indicated on the drawing, was left at the top of the side-wall sections, below the form lagging, to facilitate the next operation.

To permit accurate control of the shape of the barrel, the concreting of the top section was carried out in stages. Placing the entire mass of concrete in one operation would have caused some form settlement and trouble with shrinkage. As a means of eliminating these difficulties, a layer of Gunite first was applied from above on top of the forms, as noted on the drawing. This layer was 3 in. thick except at the crown, where it increased to 12-in. depth. The open slot at the bottom of the forms provided a ready exit for rebounds and any other deleterious material which collected while the concrete was being applied. The slot then was filled by Guniting from inside the forms. As the final step, the remainder of the upper part of the cell was concreted by ordinary methods. The weight of this concrete had a tendency to close the construction joints.

Large Cells

For the 24-ft.-dia. cells, a different method of forming and concreting was necessary. No vertical walls were included in the design of these cells. Because the 24-ft. diameter precluded accurate shaping of the invert by template, concrete for the bottom third was placed in forms which were tied down by anchor bolts and rods to concrete pads previously placed.

Separate sets of forms were used for each of the three stages of construction of the 24-ft. barrels. After the invert had been concreted, the bottom forms were removed, and the side forms were set for the middle third. These forms, in turn, were stripped before top forms were placed for concreting the final third of the cells. Construction joints were formed at recesses located about one-third and two-thirds up the side of the cell walls. The recesses accommodate track for retractable platforms employed in setting engines to be tested. Use of separate sets of forms eliminated the danger of cumulative settlement which might have occurred in barrel forms. In addition, use of an individual set for each third of the cell simplified the formwork and provided more working space.

All forms were well built, strongly braced and securely bolted. Each circular barrel has transition sections at the two ends opening into rectangular intake and exhaust chambers. A photograph shows formwork for one of these transition sections. In addition to these struc-

(Continued on page 158)

GREEN HANDS

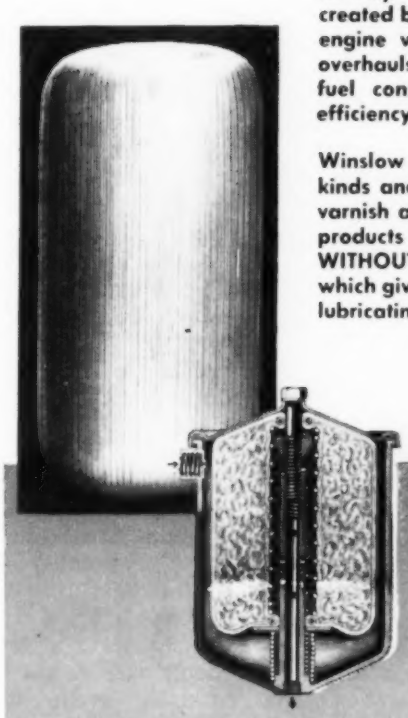
ON THE JOB
GREEN HANDS
IN THE SHOP

multiply the problem of keeping valuable overworked Motor Equipment running efficiently and economically!

One GOOD Answer
to the problem is to use finest lubricants . . . and

Keep the Oil Clean with

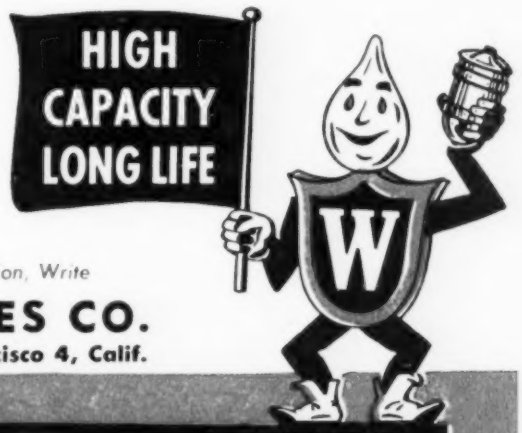
WINSLOW Oil Conditioning Units



More than ever your truck and tractor engines need the protection of Winslow Oil Condioning to help overcome the maintenance difficulties created by "Green Hands" . . . to stop excessive engine wear, to extend the periods between overhauls, to reduce oil and gasoline or Diesel fuel consumption and to increase operating efficiency.

Winslow Full-Flow Filter Elements remove all kinds and sizes of abrasive substances, absorb varnish and sludge and neutralize acid forming products of combustion. All this is accomplished WITHOUT REMOVING the valuable ADDITIVES which give modern COMPOUNDED oils their high lubricating efficiency.

WINSLOW Filter Units are available to meet any capacity or need, and there's a Winslow Replacement Element to fit nearly all makes of filter cases. These elements can be changed, in most instances, without breaking oil lines.

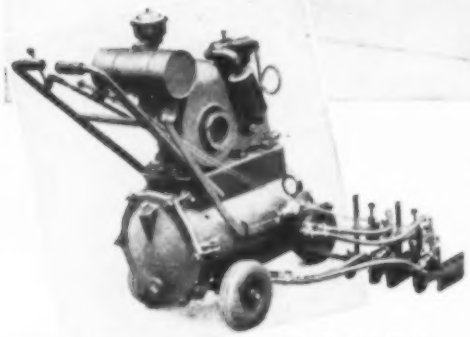


For Complete Franchise Information, Write

WINSLOW SALES CO.
406 Montgomery St., San Francisco 4, Calif.

WINSLOW
OIL FILTERS • CONDITIONERS • ELEMENTS

A Product of Winslow Engineering Co., Oakland 8, Calif.



Rear view of M-B hand-propelled Marker equipped for double line striping.

It's much easier to control city traffic if streets are properly striped. This handy M-B Marker simplifies the striping job. It handles ALL types of marking: Center-lines, parking areas, cross walks, safety zones, etc. Can also mark athletic fields, airports, tennis courts, playgrounds, etc., and is quickly convertible to an all-purpose paint sprayer. Write for descriptive bulletin.

MEILI-BLUMBERG CORP.
Box CM-10 New Holstein, Wis.

MB MARKERS

WELLMAN WILLIAMS TYPE BUCKETS

BUCKET QUALITY BACKED BY TWO FAMOUS NAMES

Williams Buckets have been famous for nearly 40 years for their many mechanical features.

Since 1931, Williams Buckets have been built by Wellman, known for many great engineering achievements in the heavy iron-ore, coal, and steel industries. The welded construction which featured Wellman custom-built buckets for extra heavy steel mill service, is now used in all

Wellman-Williams Buckets
FOR LONGER SERVICE WITH LESS MAINTENANCE COST

Built in Multiple Rope, Power Arm, and Power Wheel Types in ⅜ yd. to 16½ yd. capacities.

The Wellman Engineering Company
7017 Central Avenue Cleveland 4, Ohio
Sales and Service Agencies in Principal Cities

SEND FOR FREE BULLETIN
Tell us about your particular requirement and we will send full description of construction and features in special bulletins which clearly prove why YOUR NEXT BUCKET SHOULD BE A WELLMAN.

(Continued from page 156)

tural features, numerous openings into the control rooms, fittings for engine blocks and tramways, a large amount of piping and electrical conduit and some complicated reinforcing added to the difficulties of the job.

Ingenuity in construction methods was one of the deciding factors in the award of an Army-Navy "E" to the joint contractors, Long Construction Co., Kansas City, Mo., and Turner Construction Co., New York, operating as Long-Turner, builders of the plant for the Defense Plant Corp. John C. Long was project manager, and the assistant project managers were Robert Long and M. Herschel Parsons, the latter representing the Turner Construction Co. Albert Kahn Associated Architects and Engineers, Inc., Detroit, designed the test cells and all other buildings of the plant.

★ ★ ★

Packaged Steel Hangar

(Continued from page 82)

by a 1-in. tierod under the hangar floor.

All materials for the Washington hangar came to the site completely disassembled and tied in bundles or packages with a total cubage no greater than the space in a 50-ft. railroad box car, but the aggregate weight was too much for shipment in a single car. Interchangeability of parts simplified the assembly of the hangar. Chord segments of the arch ribs, for example, are all interchangeable with the exception of the end segments which attach to the base plates.

Erecting Arch Ribs—Chord segments for the arches were laid out on the ground and were bolted together with lattice diagonals. About 10 men worked at this operation while footings and base plates were being placed. As the first step in final assembly of each arch, end sections were hinged to the base plates by means of trunnion bolts through the base channels to permit the assembled arch ring to revolve about the trunnion as the arch was raised. Assembly was completed by bolting the remaining arch segments into the full arch ring.

At the Washington airport, a truck crane with a 60-ft. boom raised the first two arches. The remaining arches were

(Continued on page 160)

Most Power
PER POUND OF WEIGHT

Just as the dynamic co-ordinated power of the tiger outstrips an elephant, Kiekhaefer-Built Mercury Engines deliver most power per pound of weight. The development of better, lighter materials is partly responsible, but Kiekhaefer engineers pioneered in combining these materials with new methods and finer precision to produce 2-cycle, air-cooled, industrial, portable engines that have set new standards for power delivery and performance.

Building thousands of engines for various military and defense applications has again proved the soundness of Kiekhaefer engineering.

2½, 4, 6, 9 Horsepower...1 and 2 cylinder

Let Kiekhaefer Power Your Postwar Product

If you have developed or are developing a postwar product that requires lightweight, flexible power, Kiekhaefer may be able to supply or develop the exact engine to meet your needs. Get full information on the dependable, long lived Mercury Industrial Engines.

Write today for free Bulletin 101.

BUY MORE WAR BONDS AND KEEP THEM

KIEKHAEFER CORPORATION

CEDARBURG WISCONSIN

ARMY E NAVY

MERCURY INDUSTRIAL ENGINES **MERCURY OUTBOARD MOTORS**

Hard-Facing Saves $19.00 Roller Replacements

Generally a one-pass layer of Coast Metals is all that's needed to restore original dimensions. Where rollers are badly worn, first build up the surface almost to finished size with mild steel.

THE NEXT TIME your double-flange tractor rollers become badly worn, try reclaiming them with Coast Metals Hard-Facing. Not only will the cost of new rollers be saved, but delays in getting replacement parts are avoided. Idle labor is reduced to a minimum. One company reports a replacement saving of $19.00 for each roller reclaimed as well as other savings.

Coast Metals Hard-Facing is extra-resistant to wear and abrasion of dirt and sharp sand. Technical Pamphlet 201 goes into detail. Write for this today.

COAST METALS, INC.
Plant and General Offices: Canton, Ohio
Executive Offices: New York 19, N.Y.

COAST METALS *hard-facing weld rods*
MAKE YOUR EQUIPMENT LAST LONGER

Cave-ins are Not a "Necessary Evil"

Simplex Trench and Timber Braces, 18 to 60 inches long (in closed position)

Contractors everywhere have found Simplex Trench Braces a profitable investment, because they effectively prevent cave-ins with their consequent injuries and costly re-digging. Only Simplex Timber Braces are made with drop-forged balls and sockets and lever nuts. Unbreakable and more durable than malleable braces. The blunt safety lever nut further prevents accidents.

Simplex LEVER · SCREW · HYDRAULIC **Jacks**

Templeton, Kenly & Co., Chicago (44), Ill.
Better, Safer Jacks Since 1899

(Continued from page 158)

lifted into vertical position with the aid of two 40-ft. leaning or pivoted gin poles, utilizing a double hitch attached to the quarter points of the arch ring and reeved to the drum of a winch truck. Photographs illustrate the method.

After the first two arches had been raised by the truck crane in one day, bad weather and wet ground conditions delayed the work for nearly two weeks. Four arches then were raised in one day with the two leaning gin poles, and the erection of the remaining arch ribs was completed by the same method less than three weeks later.

On the previous trial installation of the first hangar erected, a single vertical gin pole, with tackle attached to central and intermediate points on each arch rib, had served satisfactorily for raising the arches.

Roof Deck

Steelox interlocking roof panels of 20-gage sheet steel in pressed channel shapes of three alternating widths, 8, 10 and 14 in., 16 ft. 4¾ in. long, were bolted to the flanges of the top chords. Placing of the roofing panels started as soon as the first few arches had been raised. Protruding edges of the panels served as a ladder for the workmen, making scaffolding unnecessary. The work progressed rapidly, and the roof deck was completed within a few days after the last arch had been raised. An average of 18 men was employed on erection of arches and roof.

Ordinarily, the channel-shaped panels form the finished roof. On the Washington hangar, however, the plans called for 1-in. rigid fiber board insulation to be attached to the steel panels with 1½-in. helix nails and covered with four-ply built-up roofing. In installations where the steel roof deck is left exposed, with no insulation of roofing placed on top of it, water drains the length of the channel-shaped panels into the gutters formed by the top chords of the arch rings.

At the crown of the roof is a ventilating monitor affording sufficient openings to provide five complete air changes an hour without mechanical blowers. On the Washington hangar, two-fifths of the openings are covered to reduce the rate of air change.

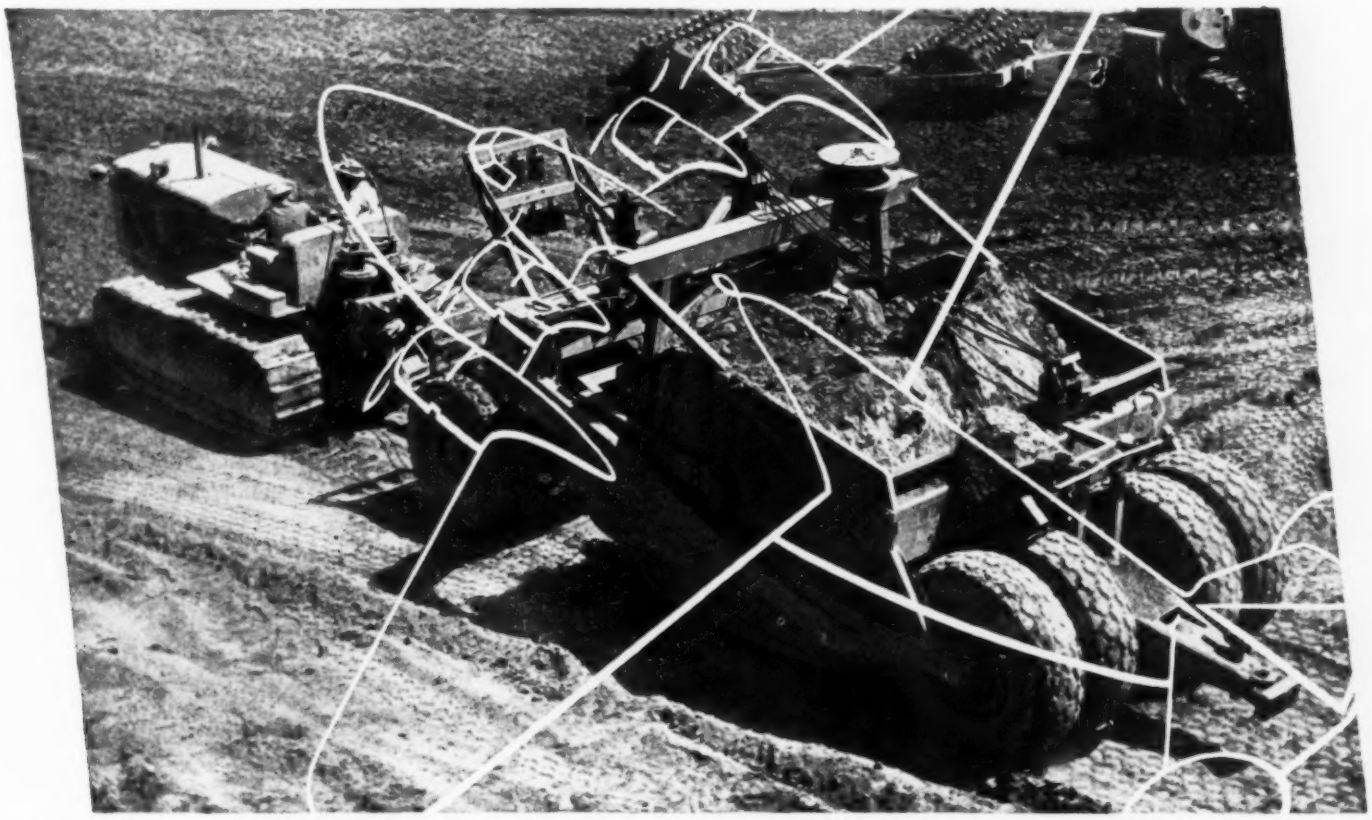
Hangar Ends and Doors

One end of the Washington hangar is completely closed with 18-gage Steelox panels. The other end has a doorway 165 ft. wide by 20 ft. high, with a center section 14 ft. wide which opens to a height of 40 ft. to permit the tail fins of large planes to pass through it.

For the door, a new design made up

(Continued on page 162)

WOOLDRIDGE TERRA CLIPPER SCRAPERS



MOVE WORLDS OF EARTH

IN LESS TIME — AT A LOWER COST

Backed by a world of job-proven performance, Wooldridge huge-capacity Terra-Clipper Scrapers operating on the Boiling-Bowl principle move worlds of earth faster, cheaper and easier. They are designed and built from the ground up with proper load balance and super-dreadnought construction to withstand greater abuse over longer periods of constant use--with less wear and tear--less down-time for repair. Faster loading and dumping of larger heaping loads enables them to make more trips per shift--moving greater yardages in less time--with less trouble--at a lower yardage cost. Put Wooldridge Scrapers on every job and compare the contrast in yardages, time and cost.

Wooldridge Bulldozers are also built first—to outlast.

•

WOOLDRIDGE SCRAPERS ARE SUPPLIED TO THE U. S. GOVERNMENT FOR 2-LINE OPERATION, PERMITTING THE USE OF 2-DRUM POWER UNITS

WOOLDRIDGE

MANUFACTURING COMPANY • SUNNYVALE, CALIFORNIA

SCRAPERS • POWER UNITS • BULLDOZERS • RIPPERS • TRAIL BUILDERS

BOILING BOWL TERRA CLIPPER PRINCIPLE SCRAPERS

(Continued from page 160)

of a number of rolling leaves, 10½ ft. wide by 20 ft. high, employs a single rail to carry these leaves across the width of the opening. At the two ends, the leaves are stacked in storage towers by switching them on to parallel rails. Each door leaf consists of Steelox panels set in a surround of heavy channels.

Plans for the Washington hangar called for lean-tos 15 ft. high and 26 ft. wide at the top, extending 5 ft. beyond the base of the hangar proper, on both sides of the structure for its full length. The lean-tos, constructed of Steelox panels insulated on the inside with ½ in. fiber board, are to house the shops and offices.

Direction

U. S. Engineer forces graded the site, constructed the concrete footings and paved the floor of the hangar at the Washington National Airport. Col. John M. Johnson is district engineer, Lt. Col. P. C. Door is contracting officer, and Maj. George H. Christensen is resident engineer.

Hangar erection was by the construction division of Armco Drainage & Metals Products, Inc., Middletown, Ohio, under the supervision of C. H. Anderson, with H. R. Bigler as resident superintendent.

THE POINT IS THIS!

WE WERE READY FOR WAR:

Novo's Line of Construction Equipment met Army and Navy Specifications. To get in the fight, it merely had to put on a uniform of G.I. paint. The same fine Novo Engines, Pumps, Hoists, and Generator Sets that have served you for so many years, were ready to serve your Country. Yes, when the Call to Arms came, Novo Construction Equipment was ready for war!

WE'LL BE READY FOR PEACE:

The big Novo Plant won't have to be reconverted. There will be no idle period of preparing for peacetime production. Novo Construction Equipment, tempered by war, will be available for your post-war needs. Come V-Day, Novo will be ready to serve you again without undue delay. Yes, Novo will be ready for Peace . . . . and ready to fill your Construction Equipment needs.

We are currently in production on all items illustrated at the right. While most of our production is reserved for the Armed Forces, we can make limited shipments to Civilians with proper Priority.

Also a member of A.E.D.

NOVO ENGINE COMPANY LANSING, MICHIGAN

NOVO ENGINE COMPANY, 214 Porter St., Lansing, Mich.

Please send me Consolidated Catalogue, No. 4-43, for Novo's Complete Line of Construction Equipment.

NAME:_____

ADDRESS:_____

Serving the Services is a HIGH HONOR

WHITE TRANSITS and LEVELS

are doing an outstanding job throughout the World

TYPE II U. S. ARMY TRANSIT

• ACCURACY • PRECISION
• DEPENDABILITY

Recommended for precise Municipal, Railroad, Highway and Bridge Work.

DAVID WHITE CO.

315 W. Court St. Milwaukee 12, Wis.

• Send for Bulletin 1039

WITH BUCYRUS-MONIGHANS IT'S *All Weather* PERFORMANCE

When bad weather makes footing too soft for other excavators, your Bucyrus-Monighan walking dragline will keep going, delivering the big output for which it is famous. Smooth walking traction carries it safely, surely around trouble — the large bearing area provides solid footing even in soft muck. Long reach, quick swing, fast hoisting, and controlled lowering insure fast digging.

That's the essence of the Bucyrus-Monighan performance story—the result of "years-ahead" design and construction, the reason you get your excavating work done **fast** with a Bucyrus-Monighan on the job.

Plan now to include field-proved Bucyrus-Monighans in your excavating equipment. Take advantage of their all-weather performance for quick solutions to your digging problems.

0-51

Sold by

BUCYRUS-ERIE COMPANY

"Years Ahead" Excavators for the Years Ahead

SOUTH MILWAUKEE, WISCONSIN

You Get Bigger loads and more profits with HEIL Cable Dozers

Heil Hi-Speed Cable Scoops give you extra speed on long hauls . . .

This big 15-yard tractor scoop is push loaded in 40 to 50 seconds — and hauls at travel speeds up to 20 miles per hour. The tilting floor gives positive mechanical push-out from the bowl and spreads load evenly. It's one of Heil's "bigger yardage at less cost" units that you will need in your post-war business. *Write for bulletins.*

SEE YOUR INTERNATIONAL TRACTRACTOR DEALER

. . . The full power of your tractor drives on the blade to move more "pay dirt"

Here is a rugged unit that is easily adjusted for an extra deep bite — whether in soft dirt or hard-packed clay — to give you a heaping load. And it's just as easy to adjust this unit for side-casting to right or left — to peel a bank — to grade or ditch — or to push straight ahead. Heil Cable Dozers have the quality features that experienced operators demand: Full vision ahead — fast, positive cable control with little effort—smooth action that is easy on the tractor—and less time out for adjustments and repairs. These famous Heil features add up to "big loads" at less cost — and more profit for you.

Write for bulletins.

R-37

ARMY NAVY

THE HEIL CO.

GENERAL OFFICES • MILWAUKEE 1, WISCONSIN

Advertisers in this issue

(Continued from page 166)

Kiekhaefer Corp. 159
Koehring Company, The 125

LaPlant-Choate Mfg. Co., Inc. 8
Laughlin Co., The Thomas 150
Lehigh Portland Cement Co. 40
Leschen & Sons Rope Co., A. 25
Le Tourneau, Inc., R. G. 20
Lidgerwood Mfg. Co. 98
Lima Locomotive Works, Inc. 99
Link-Belt Speeder Corp. 131
Littleford Bros., Inc. 90
Lone Star Cement Corp. 5
Lowell Wrench Co. 148
Lufkin Rule Co., The 138

Macmillan Petroleum Corp. 155
Macwhyte Co. 143
Mall Tool Co. 98
Master Vibrator Co. 132
McGraw-Hill Book Co., Inc. 130, 146
Meili-Blumberg Corp. 158
Mercer-Robinson Co., Inc. 122
Michigan Power Shovel Co. 49
Mine Safety Appliances Co. 110
Mir-O-Col Alloy Co. 12
Moretrench Corp. 87

National Gunite Corp. 116
Northwest Engineering Co. 137
Novo Engine Co. 162

Oakite Products, Inc. 104
Osgood Co., The 45
Owen Bucket Co., The 142

Parsons Co., The 154
Preformed Wire Rope 38

Ransome Machinery Co. 114
Rodgers Hydraulic, Inc. 119
Rogers Bros. Corp. 136

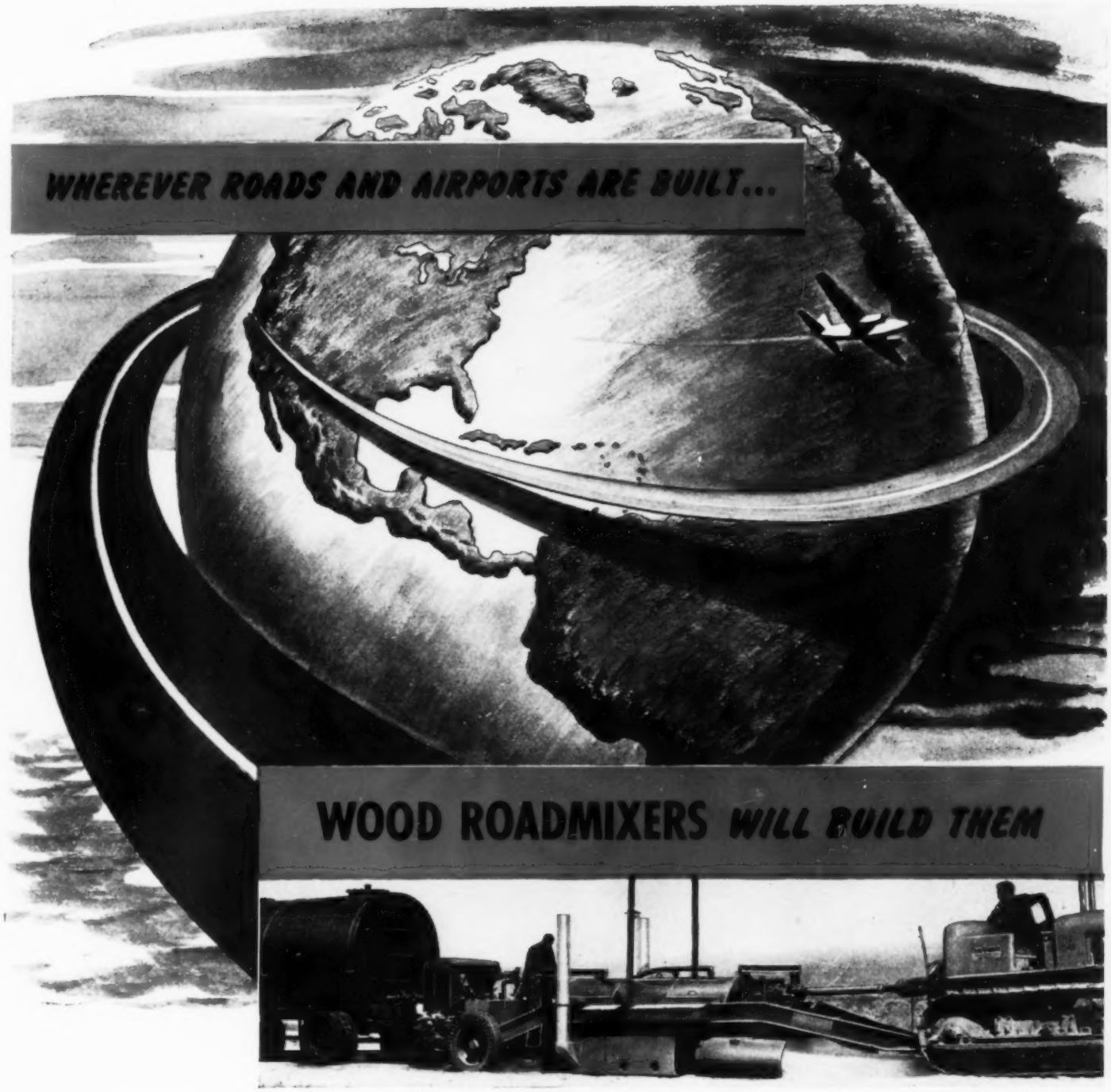
Schramm, Inc. 96
Searchlight Section 166
Shell Oil Company 11
Shunk Manufacturing Co. 150
Sinclair Refining Co. 139
Sisalkraft Co., The 126
Skilsaw, Inc. 30
Snap-on Tools Corp. 116
Socony-Vacuum Oil Co., Inc. 133
Sonoco Products Co. 88
Southwest Welding & Mfg. Co. 108
Standard Oil Co. (California) 28
Sterling Machinery Corp. 166
Sterling Wheelbarrow Co. 152
Surplus War Property Newsletter 118
Syntron Company 118

Templeton, Kenly & Co. 160
Texas Company, The 21
Thermoid Company 32
Thew Shovel Co., The 17
Timken-Detroit Axle Co., The 105
Timken Roller Bearing Co., The ..... 4th Cover
Trackson Company 149
Trojan Powder Co. 19
Tyson Bearing Corp. 39

Union Fork & Hoe Co., The 122
Union Iron Works, Inc. 110
Union Metal Mfg. Co., The 26
Union Steel Products Co. 138
Union Wire Rope Corp. 91
United States Steel Corp., Subsidiaries 31, 47
Universal Atlas Cement Corp. 42
Utility Elevator Service 166
Upson-Walton Co., The 48

Van Der Horst Corp. of America 97
Viber Company 166
Vulcan Iron Works 118

Wellman Co., The S. K. 6
Wellman Engineering Co., The 158
White Co., David 162
White Mfg. Co. 166
Whiteman Mfg. Co. 132
Wickwire Spencer Steel Co. 127
Williams & Co., J. H. 129
Winslow Sales Co. 157
Wood Manufacturing Co. 165
Wood Shovel & Tool Co., The 93
Woolridge Manufacturing Co. 161
Worthington Pump & Machinery Corp. 114



faster, better and at less cost!

A lot of roads and airports will be needed after this war—and money won't be as easy as it is today. Taxpayers will demand an accounting of every dollar spent. *Economy must become the watchword of the nation, after this wastage of war.* That's why road-mix and Wood Roadmixers will be used for an ever increasing amount of construction.

Wood Roadmixers use native and local materials, reducing hauling costs to a minimum. The Wood Roadmixer is a traveling mixing plant, eliminating the central plant and saving equipment and labor.

The Wood Roadmixer handles emulsions, road oils or soil-cement, giving wide choice of materials and methods to be used. And finally the Wood Roadmixer produces highest quality pavement, lower in first cost and lower in maintenance cost.

This all adds up to the fact that wherever roads and airports are built, today or tomorrow, Wood Roadmixers will build them faster, better, and at less cost.

Wood Roadmixers are complete traveling mixing plants, available in two sizes. They are sold through leading equipment dealers throughout the United States. If there isn't a dealer in your territory, write us for literature and costs of the Wood Roadmixer—*a complete traveling mixing plant.*

WOOD ROADMIXER

Wood Manufacturing Co. • 816 West 5th St., Los Angeles 13, California

Breakdowns COST Money!
Avoid 'Em! Get Done Ahead of Schedule with
VIBER
Concrete Vibrators
Vibers are rugged and FASTER than ever—now 9500 RPM in concrete! If time counts and breakdowns hurt, switch to dependable VIBER-ation.
Find out about Viber's easy-to-carry size and other exclusive features. Write for catalog.
VIBER COMPANY
726 South Flower Street
BURBANK, CALIFORNIA

Advertisers in this issue

Adams Co., J. D. 89
Aircraft & Diesel Equip. Corp. 128
Alemite Div., Stewart-Warner Co. 100
Allied Steel Products, Inc. 126
Allis-Chalmers Mfg. Co. 84, 85
American Bosch Corp. 153
American Cable Division
American Chain & Cable Co., Inc. 3rd Cover
American Chain & Cable Co., Inc. (American Cable Division) ..... 3rd Cover
American Hoist & Derrick Co. 95
American Steel & Wire Co. 31
Armstrong Bros. Tool Co. 154
Associated Equipment Distributors 18
Athey Truss Wheel Co. 10
Atlas Powder Co. 124
Austin-Western Company 14, 15

Baker Mfg. Co., The 36
Bay City Shovels, Inc. 41
Bethlehem Steel Co. 42
Blaw-Knox Div. of Blaw-Knox Co. 112, 113
Briggs & Stratton Corp. 144
Broderick & Bascom Rope Co. 13
Buckeye Traction Ditcher Co., The 145
Bucyrus-Erie Co. 29, 163
Butler Bin Co. 34
Byers Machine Co., The 33

Calcium Chloride Assn. 147
Carver Pump Co., The 140
Caterpillar Tractor Co. 9
C. H. & E. Mfg. Co. 128
Chain Belt Company 107
Cleveland Rock Drill Co., The 117
Cleveland Trencher Co., The 156
Climax Engineering Co. 102
Clipper Mfg. Co., The 136
Clyde Iron Works, Inc. 135
Coast Metals, Inc. 160
Complete Machinery & Equip. Co., Inc. 166
Construction Machinery Co. 27
Cummins Engine Co. 151

Diamond Chain & Mfg. Co. 123
Dixie Cup Co. 134
Dixon Valve & Coupling Co. 128

Electric Tamper & Equipment Co. 104
Euclid Road Machinery Co., The 7

Firestone Tire & Rubber Co., The 109
Foote Company, Inc., The 121

Galion Iron Works & Mfg. Co., The 43
Gar Wood Industries, Inc. 46
General Excavator Co., The 45
General Motors Corp. (Electro-Motive Div.) 16
Goodrich Co., B. F. 37
Goodyear Tire & Rubber Co. 50
Gorman-Rupp Co. 134
Griffin Equipment Corp. 142
Griffin Wellpoint Corp. 106
Gulf Refining Co. 94

Haiss Mfg. Co., Inc., Geo. 166
Harnischfeger Corp. 111
Heil Company, The 92, 164
Hetherington & Berner, Inc. 156
Homelite Corp. 44
Hooper & Sons Co., Wm. E. 115
Huber Mfg. Co., The 24

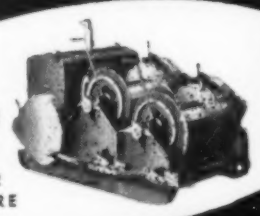
Independent Pneumatic Tool Co. 22, 23, 101
Industrial Brownhoist Corp. 152
Inland Steel Co. ..... 2nd Cover
Insley Mfg. Corp. 120
Iowa Manufacturing Co. 103
Iron & Steel Pdts., Inc. 166
Isaacson Iron Works 141

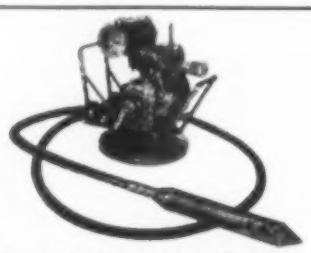
Jaeger Machine Co., The 35
Johnson Company, The C. S. 138

WHERE TO BUY

Featuring additional Products and Specialties for the Construction Industry

COMPLETE
WELL POINT SYSTEMS
WILL DRY UP ANY EXCAVATION
Faster—More Economically
Write For Job Estimate and 32 page Catalog
COMPLETE
MACHINERY & EQUIPMENT CO., Inc.
36-36 11th St., Long Island City, N. Y.
Tel. IRonsides 6-8600
Branch: Third Avenue & Adams St., Gary, Indiana
Telephone: Gary 2288

STERLING QUALITY
STERLING HOISTS
SIMPLE
DEPENDABLE
RUGGED
•
WRITE FOR LITERATURE

STERLING MACHINERY CORPORATION
405 Southwest Blvd., Kansas City, Mo.


Concrete VIBRATORS and Grinders
Write for Circular on types, sizes and prices
White Mfg. Co.
ELKHART INDIANA

GEORGE HAISS MFG. CO., INC.
139th ST. & CANAL PL., NEW YORK 51, N.Y.
HAISS CLAMSHELL BUCKETS

If this or other advertising does not supply the information concerning products or services wanted, please write:
CONSTRUCTION METHODS

SEARCHLIGHT SECTION

1. No. 2 Koehring 3-way combination crane, dragline & Shovel
   Model 77 Lorain Comb. shovel, & Dragline, 1½-yd. cap.
7. Allis-Chalmers Speed-Ace Tractor Wagons, 7½ yd. cap.
5. Super "C" Model 15 FDT Euclids, with Cummins Diesel Engines
10. Model 9FDT Euclids with Cummins Diesel Engines
2. 500 CFM Ingersoll-Rand Diesel-powered portable air compressors
1. 315 CFM Ingersoll-Rand Diesel-powered portable air compressor

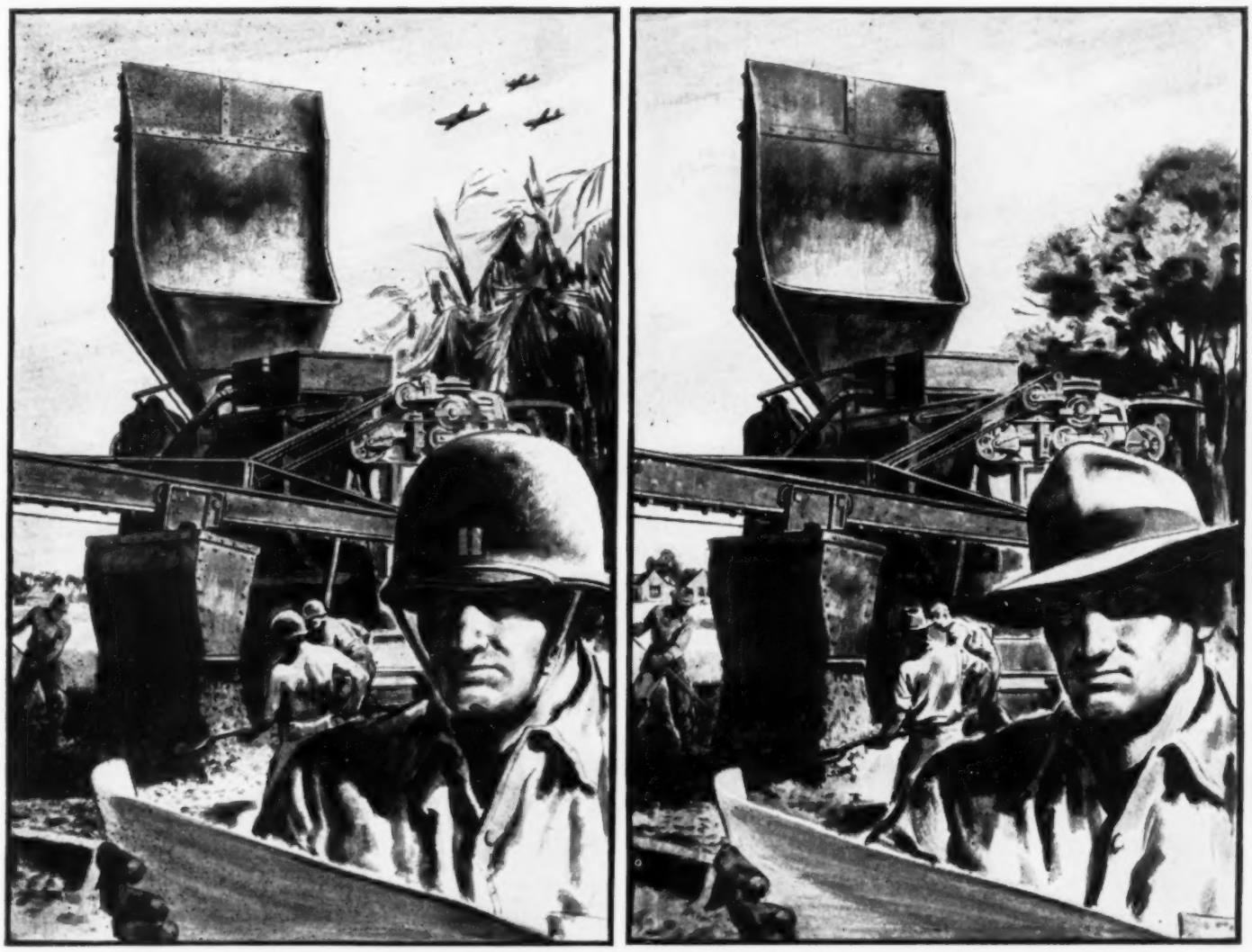
IRON & STEEL PRODUCTS, INC.
13458 S. BRAINARD AVE.
CHICAGO 33, ILLINOIS
"Anything containing IRON or STEEL"

U.S. 1¼" universal electric drill	$75.00
Heavy duty screw jacks, 3" dia. screw, extends 20" to 28" (each)	35.00
2-ton spur geared chain blocks (each)	70.00
10 centrifugal water pumps—bargain	

Utility Elevator Service
34 JUMEL PLACE NEW YORK CITY

POSITION VACANT

DESIGNING ENGINEERS: Positions open at Barber-Greene Company for mechanical engineers on design of equipment for road construction, ditching, aggregate handling, coal handling, and general conveying applications. Barber-Greene Company, Aurora, Illinois.



BRIDGING THE GAP to Peacetime Jobs...
American Road Builders' Plan points way

Every day brings us closer to a most important wartime problem, *i.e.*, peacetime jobs for the boys who are winning the war.

The American Road Builders' Association has submitted a comprehensive plan for post-war roads and jobs. It calls for construction of needed new highways and improvement of the present United States highway system, including bridges and grade crossings. It would create jobs for millions of men.

3,000,000 jobs on highway construction alone. Millions of other jobs making and supplying machinery and materials. Jobs all over the country. Jobs that would pay good wages. Jobs that would greatly improve the America we love.

There's an inspiring 64-page booklet, "A SOUND PLAN FOR POST-WAR ROADS AND JOBS," prepared by the Association. Get a copy today. Write for it to The American Road Builders' Association, 1319 F St. N.W., Washington 4, D. C.

In Business for Your Safety

AMERICAN CABLE DIVISION

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Tacoma

AMERICAN CHAIN & CABLE COMPANY, INC., BRIDGEPORT, CONNECTICUT

TIMKEN ROCK BITS

used for all drilling on the Sweetwater Falls Dam Project

The Sweetwater Falls Dam project, located near San Diego, California, presents an unusually difficult rock drilling operation. The dam is being constructed in a narrow deep canyon and the working face is nearly 300 feet high.

In this connection, the prime contractor, Macco Construction Company, writes: "We could enumerate other reasons for using Timken Rock Bits, but the elimination of steel transportation is of major importance on this project."

From Mr. Huso Festich, excavation superintendent, comes this statement: "I have found the Timken Bit to be entirely satisfactory from every standpoint." As stated above, all rock drilling on this job is being done with Timken Bits, both wagon drills and sinkers being used.

You, too, can save with Timken Removable Rock Bits — no matter what your conditions may be; for Timken Bits drill faster; last longer per use; can be resharpened a number of times, depending upon the rock being drilled; eliminate steel transportation; and avoid delay at the working face. Write for name of nearest Authorized Distributor. The Timken Roller B aring Company, Canton 6, Ohio.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

ROCK BITS